WEST MARKETING ISSUE
Pages 9-16

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Fertilizer Trials on Dry Range Land In California "Exceed Fondest Hopes"

By SIDNEY H. BIERLY
General Manager, California Fertilizer Assn.

We in California have long felt that fertilizer research applied to representative areas of our 30 million acres of dry range land would prove beyond any question that proper fertilizer use would assure significant increases in forage plant growth, and thus in meat production per acre. Recent field-size tests and demonstrations in most dry range areas of the State have produced results exceeding our fondest hopes, and we feel that our industry is now on the threshold of a big, new, and mutually profitable relationship with Califonria's livestock producers.

About 10 million acres of this range land in California consists of open, treeless land, on which surface application of fertilizer can be employed, except in rough, hilly areas. The balance, about 20 million or more acres, consists of oakgrass woodland and brushy areas, where fertilizer application by airplane is most feasible. In the tests and demonstrations described here, the most suitable of these methods of application was employed in each case.

We will report on recent range fertilization research sponsored by the University of California, and by California State Polytechnic College. We will also report on range fertilization activities of segments of the fertilizer industry itself, some in cooperation with one or the other of these State institutions, and in some cases, with the cooperation of the Soil Conservation Service.

In tests conducted by the Univer-

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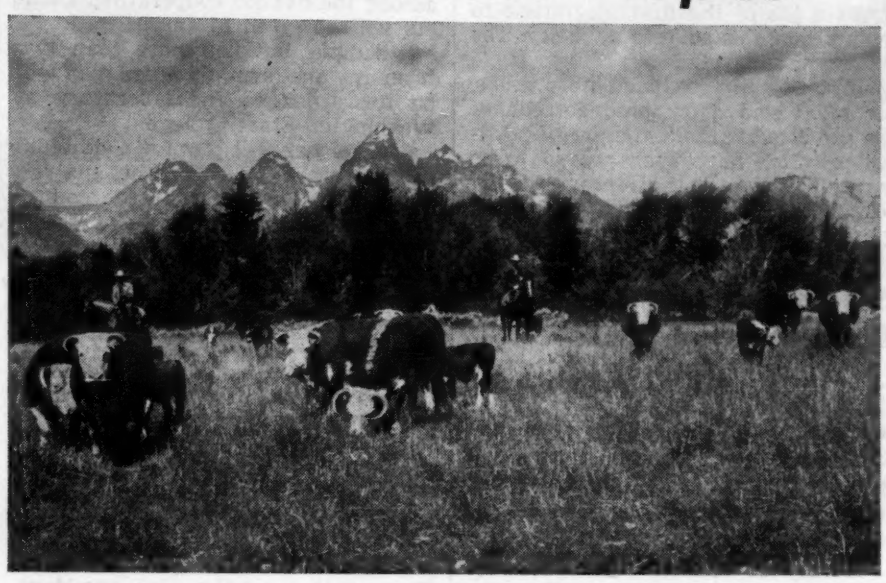

Fertilizer Boosts Forage Growth, Meat Production on Range Land Such as shown Above

May Super Production Lower than Year Ago

WASHINGTON — May production of superphosphate and other phosphatic fertilizers amounted to 211,642 tons, a decrease from 223,590 tons in May, 1956, the Bureau of the Census has reported. Shipments last May totaled 173,863 tons, a gain over shipments of 127,947 tons in May a year earlier. Stocks on hand at the end of May this year were 206,682 tons, compared with 320,657 tons a year earlier.

Production in May of this year included 123,173 tons of normal and enriched, 68,067 tons of concentrated and 20,402 tons of other phosphatic fertilizers, including wet-base goods.

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FUTURE UNLIMITED . . .

Western Experts Say Use of Fertilizer Could be Doubled

That fertilizer use on many crops in the Western States could be doubled or at least expanded without much difficulty, was the consensus of some agronomic and soils experts of the region in recent comments on the subject of off-season fertilization and expansion of plant food consumption.

While some soils experts indicated that off-season fertilization might not be wise under the climatic and soil conditions of certain states of the west, there are many areas existing in which both the dealer and the farmer need education as to how off-season purchases can be a boon to all concerned.

H. M. Reisenauer, associate professor of soils at the State College of Washington, points out that the consumption of fertilizer could be greatly expanded if field men were available to advise on fertilizer usage for many specific crops. For example, it was estimated that in 1954, over 95% of the sugar beets grown in the state of Washington received plant food applications in recommended amounts, resulting in optimum yields in both quality and quantity. Mr. Reisenauer observes that more fertilizer could be used on most crops. "We find in general that farmers use more nearly optimum rates of fertilizer for those crops on which they are advised by competent experts," he says.

Other factors that would contribute to increasing the volume of plant food under Western conditions are indicated by Mr. Reisenauer as including greater use of the State's soil-testing services; education of fertilizer dealers; and increased emphasis and support of fertilizer demonstrations and fertility research programs. "These programs are the basis for a sound soil-testing program and are certainly essential if all the limiting factors of crop production are to be known."

The professor adds: "It should not be difficult to double the fertilizer use on many of our lower value per acre crops in Washington within the next ten years. If one compares fertilizer consumption on an acre basis in Washington with that of other areas of the U.S. or particularly with European countries, we find that we are extremely low. This increase in fertilizer use which should at least give a 50% increase in over all fertilizer consumption for the state, will result only from emphasis on all aspects of the problem."

J. C. Hide, professor of soils at Montana State College, Bozeman, in commenting on the possibilities of off-season fertilization in his state, expresses doubt that fertilization at times when soils are frozen and snow-covered would be practical. "If

(Continued on page 8)

Calspray Acquires Agri-Serv Facilities

SACRAMENTO — The California Spray-Chemical Corp. has announced acquisition of the majority of the anhydrous ammonia distribution facilities of the Agricultural Ammonia Service, Inc., of Santa Paula, Cal. A. W. Mohr, president of the chemical corporation, said all facilities and operations of Agri-Serv from the Lodi-Stockton area of San Joaquin County south to the Kern County line have been acquired.

1956 Output Of Pesticides Increases 13%

Sales Valued at $173 Million for Gain Over 1955

WASHINGTON — Output of pesticides and other organic chemicals in 1956 totaled 570 million pounds, about 13% more than 1955 production of 506 million pounds, according to preliminary statistics released here recently by the U.S. Tariff Commission.

Sales were more than 395 million pounds, valued at $173 million, in 1956, compared with 415 million pounds, valued at $153 million, in 1955.

Production of cyclic pesticides and other cyclic chemicals in this group amounted to 474 million pounds in 1956, compared with 429 million pounds in 1955—an increase of 10%. Sales were 339 million pounds, valued at $135 million in 1956, compared with 354 million pounds, valued at $126 million, in 1955. The chemical in this group which was produced in the greatest quantity in 1956 was DDT. The output of this product amounted to 138 million pounds in 1956.

Production of acyclic pesticides and other acyclic organic agricultural chemicals amounted to 96 million pounds in 1956, compared with the 77 million pounds reported for 1955; sales were 57 million pounds, valued at $38 million, in 1956, compared with 61 million pounds, valued at $27 million, in 1955.

California Farm Bureau Study Finds New Plant Feasible

BERKELEY, CAL. — Construction of a plant for the manufacture of anhydrous ammonia, owned and controlled by farmers and farmer organizations, "is financially feasible provided its capacity is not less than 150 tons of liquid fertilizer a day." This is the finding of a special fertilizer committee of the California Farm Bureau Federation, meeting at the Berkeley headquarters recently. Consensus of committee feeling was that a plant of lower capacity could not be competitive with major producers of anhydrous ammonia.

The committee, composed of Farm Bureau members with Fred Heringer of Butte County as chairman, is continuing its studies to explore with farmers' organizations the acceptability and methods of financing the proposed plant. A full report will be made at the next meeting of the Farm Bureau's board of directors.

The committee's report held that the output of such a plant would be

(Continued on page 8)

Undue Restrictions on Sale Of Pesticides Harmful to Farmers, NAC Official Says

WASHINGTON—A current trend in state legislation and regulation practice to force "simplification" on the pesticide industry will ultimately eliminate certain useful pesticides from the market and restrict sales to only those chemicals or formulations specified by state officials, according to L. S. Hitchner, executive secretary, National Agricultural Chemicals Assn. "Simplification" means reducing the wide variety of pesticides now available to a smaller number.

In a speech before the 15th annual convention of the Association of Southern Feed and Fertilizer Control Officials, Mr. Hitchner said the pesticide industry recognizes that there are valid reasons for one state to recommend a certain product while another does not.

He declared, however, that the industry does object to regulatory proposals which would arbitrarily limit the number and kind of effective formulations which could be sold and used for a specific pest control program. He added, "Enforced simplification would interfere with the rights of the manufacturer to sell and the rights of the buyer to select a product he wishes from a number of effective materials. This would be equivalent to prohibiting a person from buying a Cadillac because some official has decided that a Ford is better for him."

Mr. Hitchner said that this type of "simplification" is not necessary to make sure that the grower receives a good product at a fair price. "Present legislation is fully adequate to keep off the market inferior products which will not effectively control the pests for which they are recommended and sold," he said.

He added, "The pesticide industry has a record of supporting sound control legislation. Our industry assumes the burden and costs of the research, registration and other costs due to regulations to assure that the farmer gets a good product."

He pointed out that growers as well as the manufacturers would suffer from proposed "simplification" practices. "The farmer would suffer since manufacturers could not afford the expense and would not undertake research necessary to develop new products if their ultimate use depended on the arbitrary decisions of one or two individuals," he said.

Mr. Hitchner said that "in the state legislatures this year approximately 25 bills and other labeling laws have been introduced to date which would directly curb or limit the marketing of pesticides.

"With the exception of those bills which followed the pattern of the model State Insecticide, Fungicide and Rodenticide Act, most of these were marginal legislative proposals which would simply act as a retardant to research, development and marketing. Nearly all of these bills have been defeated by the agricultural interests within the respective states.

"We have tried to determine the reason for this great amount of legislative activity. Without a doubt a great part of it has been prompted by the wave of crackpot articles appearing throughout the country. Such unsound publicity tends to create a fear on the part of the public that pesticides and pesticidal residues constitute a hazard to those who consume the food products. This results in a demand for more legislative control. Another cause is the attempted use of legislative techniques to secure a special benefit on the part of some individual or group.

"While adverse publicity creates a problem for the pesticide industry, it constitutes an even greater threat to the farmer. If the public becomes fearful of a certain type of food the market for the food product decreases, and this poses a very serious loss to segments of the farm economy. The loss which would be sustained by farmers in this case would be many times the value of the pesticides used on the particular food. (Don't let's overlook the fact that cotton seed is a major food item.)

"I think that all of us in the pesticide industry, land grant college personnel and state enforcement people have a job of the first magnitude to counteract this adverse publicity. The important part of our story is to point out that food and fiber crops, or meat and dairy products cannot be produced without the use of pesticides which have been proved to be safe. This fact is not recognized by the majority of our city and urban population."

Studies Made on Control Brush on Range Lands

SAN FRANCISCO—Turning waste lands into range lands and saving rains for use on the plains are the double-pronged aims of an extensive project in watershed management now under way on three campuses of the University of California.

Nearly 13 million acres of undeveloped range lands are available in California for potential use in the production of forage for livestock. For the most part, these are now water-consuming brush lands that lie between the lower grassland areas and the higher forested elevations.

Some of the newest techniques for watershed management and their effects on water runoff were reported recently by Irrigation Specialist Robert H. Burgy of the University's Davis staff, speaking at the Intersociety Conference on Irrigation and Drainage in San Francisco.

Recent studies, Mr. Burgy said, involved seven major watershed installations, up to 4,000 acres in area, located in the Coast Ranges and the Sierra Nevada. On some of these test areas, the natural vegetation—usually brush—was removed by chemicals, controlled burning, or some other means and replaced by forage grasses. Other test areas were left in their natural state as check plots.

Pacific Plant Food Group Launches Soil Testing Program

PORTLAND, ORE.—The soil testing program being inaugurated in five counties of the state of Washington by the Pacific Northwest Plant Food Assn. got under way the first week in July. Meetings with dealers and county agents were held in Ephrata and Ellensburg, in eastern Washington and Mt. Vernon, Seattle and Vancouver, in western Washington.

The program was outlined by Grant Braun and Frank Taylor, of the Soil Improvement Committee of the association and Lowell Nelson, who recently left Washington State College, but consented to carry through with the meetings.

The plan as outlined to the dealers in the five counties provides for dividing $200 in each of five counties among the dealers cooperating. Dealers will be given $1 for collecting a soil sample, but not more than two from any one farm. Samples then will be forwarded to the laboratory at Washington State College.

The farmer will pay for the actual soil analysis. Copies of the analysis will go to the dealer, to the county agent and to the association. All samples must be drawn and sent in to the college by Sept. 5. The results will be correlated by the college and the Soil Improvement Committee of the association.

One thousand dollars was allocated by the asociation for this work which is its major project for the year.

J. C. Laegeler in New Post with Hough

LIBERTYVILLE, ILL.—R. L. Beyerstedt, executive vice president, engineering, the Frank G. Hough Co., Libertyville, Ill., has announced the appointment of Jules C. Laegeler as chief engineer.

Mr. Laegeler has been manager of the product improvement department. He came to the company in 1951 as an experimental engineer, was made senior project engineer in 1955 and departmental manager in 1956. Mr. Laegeler holds a B.S. degree from the University of Illinois.

FLORIDA CONTEST

MADISON, FLA.—Members of the Madison County, Florida 4-H and FFA clubs are competing with "old time" corn farmers in a novel contest being staged here. According to O. R. Hamrick, Jr., county agent, some 200 boys have entered the Madison County Youth and Adult Corn Contest and will plant one-acre plots, while the adults will compete on a five-acre basis.

Alfred T. Zodda

VICE PRESIDENT—Alfred T. Zodda has been appointed vice president-operations for Olin Mathieson International Corp., Henry Arnold, president, has announced. Mr. Zodda, who will be responsible for all overseas operations of the corporation, had been general manager of Squibb International division, Olin Mathieson Chemical Corp. Olin Mathieson International Corp. handles all of Olin Mathieson's overseas activities. A native of New York City, Mr. Zodda taught Romance languages at Iona College, New Rochelle, N.Y., and Maryknoll Seminary, Maryknoll, N.Y. In 1943 he was radio news editor for Latin America for the United Press and in 1944 was sales promotion writer at Merck & Co., Inc., Export. He joined E. R. Squibb & Sons in 1945.

Donald S. Marshall In New Calspray Post

RICHMOND, CAL. — Appointment of Dr. Donald S. Marshall to the position of manager, seed treating division has been announced by E. W. Cannon, vice president and manager of marketing for California Spray-Chemical Corp. Dr. Marshall's headquarters will be at the company's western executive offices, Richmand, Cal.

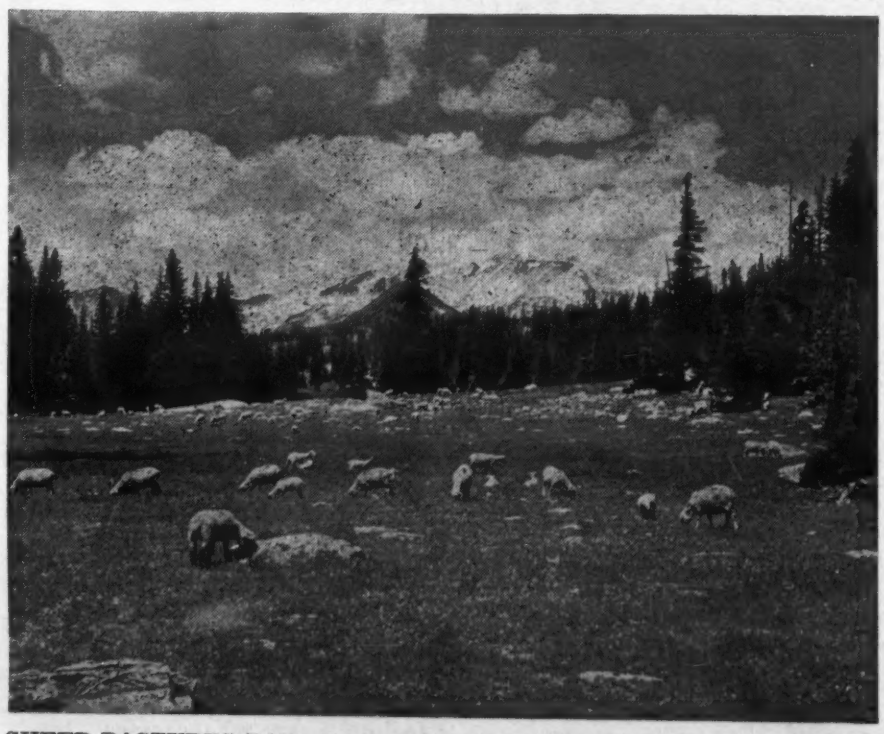
In his new position, Dr. Marshall will be in charge of Calspray's recently established seed treating division. He started with Calspray in 1951 as research entomologist at Fennville, Mich. He was later transferred to Maumee, Ohio, where he conducted the initial work in the development of Orthocide seed protectants. Prior to his recent appointment, Dr. Marshall was eastern coordinator of research for Calspray, located at the firm's Haddonfield, N. J. research laboratories.

Dr. Marshall is a graduate of Ontario Agricultural College at Guelph, Ontario and received his Ph.D. degree in Entomology from Cornell University. Prior to his enrollment at Cornell, Dr. Marshall was employed by the Science Service of Canada as a research entomologist on tobacco insect control.

Roy C. Lipps Joins U.S. Steel

SALT LAKE CITY, UTAH — Dr. Roy C. Lipps has been appointed market development representative for United States Steel Corp. and assigned to the western sales offices of the U.S. Steel Coal Chemical Sales Division in Salt Lake City, it was announced recently by R. C. Myers, director of market development.

A native of Lincoln, Neb., Dr. Lipps recently received his Ph.D. degree from the University of Nebraska. Previously, he had instructed at the university and conducted research there in soil fertility. During World War II, he served in the Pacific Theater in the Navy.



SHEEP PASTURES PAY—Ewes and lambs summer grazing in snowy range in Medicine Bow National Forest. These sheep will be removed from range grazing to lower land later in summer. (USDA photo)

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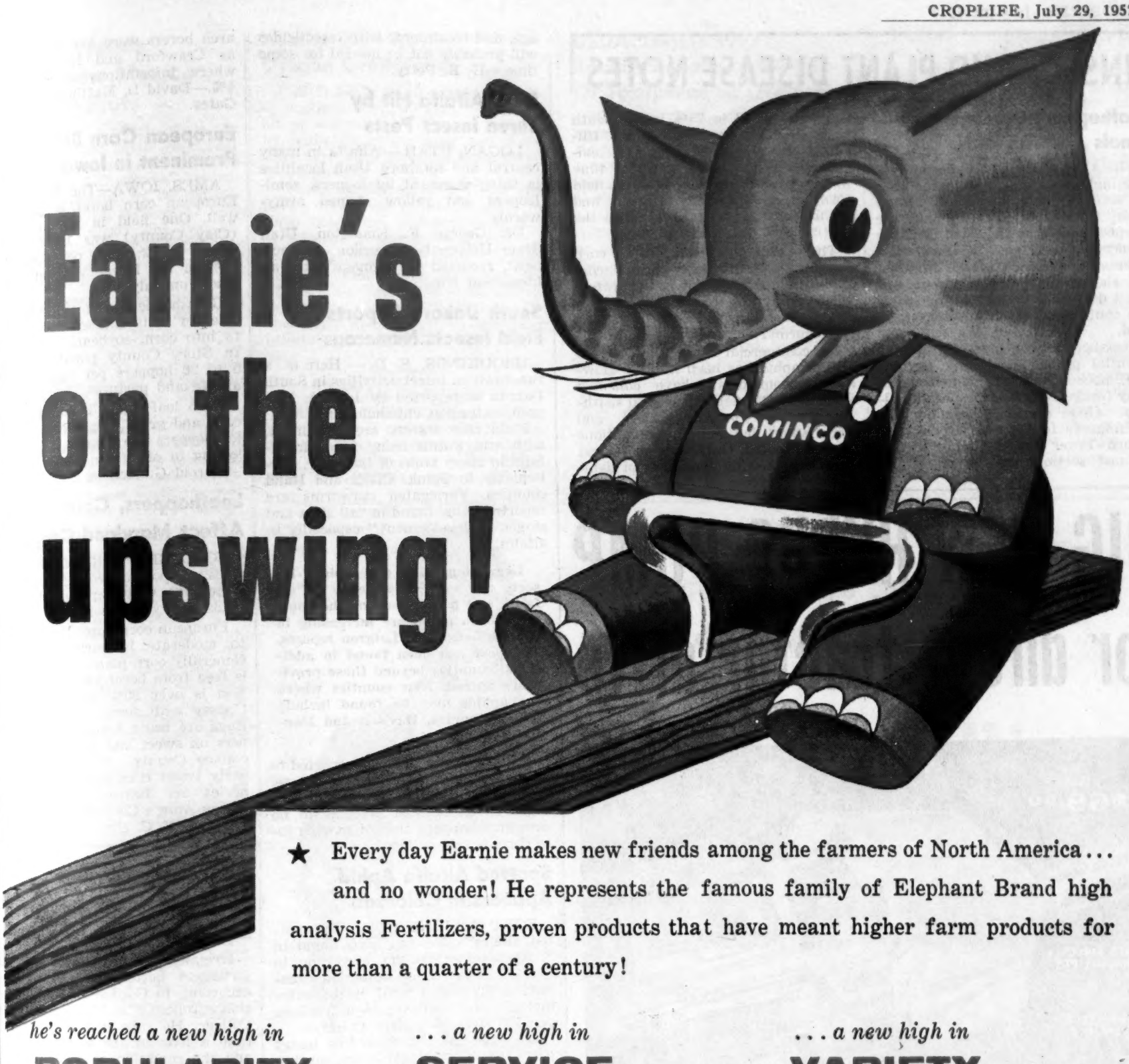

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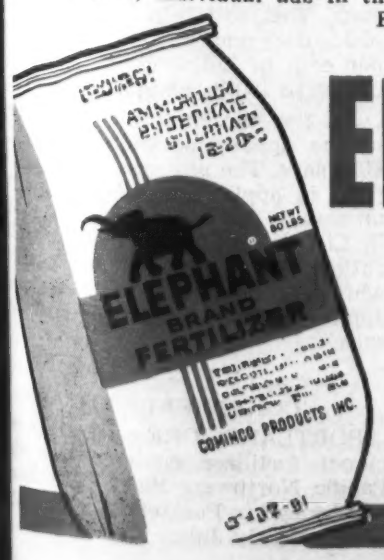

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INSECT AND PLANT DISEASE NOTES

Leafhoppers Damage Illinois Alfalfa Fields

URBANA, ILL.—It has become increasingly apparent that leafhoppers are seriously damaging many alfalfa fields throughout Illinois, and the prospects are that they will continue to increase until cold weather. Experimental evidence in the midwest has shown that damage from this insect decreases the protein and vitamin content of hay as well as total yield.

Grasshoppers continue to present a potential problem in many sections of Illinois. They are numerous in many forage crop fields, especially alfalfa. Upon cutting, these hoppers will migrate to adjacent crops.

Corn Borer pupation has begun in most sections of the state and ranges from 50 to 75% in the south to 10 to 15% in north-central Illinois. Noticeable egg-laying of second-generation moths may start any time within a week to ten days on field corn in southwestern Illinois and within ten days to two weeks in the central and north-central area.

The extent of infestations by corn earworm and fall armyworm during the next month cannot be accurately predicted at this time. However, both were present in field corn in greater than normal numbers this month.

No commercial damage by spotted alfalfa aphid has been noticed. However, entomologists have collected them in alfalfa fields in several southwestern and western counties, and some slight build-up in populations has been noted. Only very occasional fields are showing symptoms of damage, and treatments with insecticides will probably not be needed for some time.—H. B. Petty.

Utah Alfalfa Hit by Three Insect Pests

LOGAN, UTAH — Alfalfa in many central and southern Utah localities is being damaged by loopers, semi-loopers and yellow striped armyworms.

Dr. George F. Knowlton, Utah State University extension entomologist, reported the damage after an inspection trip.

South Dakota Reports Field Insects Numerous

BROOKINGS, S. D. — Here is a run-down on insect activities in South Dakota as reported by John A. Lofgren, extension entomologist.

Field crop insects are prominent, with armyworms being found in alfalfa in many areas of the state, particularly in Spink, Clark and Hand counties. Variegated cutworms are reported being found in "all sizes and stages of development," especially in alfalfa.

Lygus bugs and other plant insects are extremely heavy in alfalfa, and populations of the spotted alfalfa aphid are increasing in the southeast, Mr. Lofgren reports. The pest has been found in additional counties beyond those previously named. New counties where the aphids may be found include Brule, Douglas, Davison and Hanson.

Young grasshoppers are reported to be found in several spots in the state, and are growing fast. Farmers are urged to check field margins to be sure grasshoppers are not moving into corn, beans, or flax.

Spotted Alfalfa Aphid Appears in Colorado

FORT COLLINS, COL.—The spotted alfalfa aphid has been found in Southeastern Colorado, according to the Colorado Insect Detection Committee. In recent field trials, entomologists took an average of 5 adults per 100 sweeps in Bent County.

Last year at this time this insect pest had been reported in varying numbers in 15 Colorado counties, especially in Prowers, Otero and Bent counties. Currently, however, the pea aphid is the big threat in the Arkansas Valley. Recent field surveys revealed this insect at the rate of 200 adults per 100 sweeps.

Grasshoppers Threaten Kansas Grain Crops

MANHATTAN, KAN. — Extremely heavy grasshopper populations are causing crop destruction to alfalfa, corn and sorghum in many areas of the central Kansas region. Nymphs are rapidly becoming adults and are migrating from the hatching areas, weed patches, fence rows, roadside ditches and other marginal areas, out into the cropland.

Webworms are increasing throughout many areas of the state with heaviest populations found in the southeastern area. Destructive populations were found on alfalfa, soybeans and small late-planted corn and sorghum.

Fall armyworm infestations were found in nearly all corn fields surveyed in east central and southeast Kansas. Counts ranged from 4 to 56% plant infestation, with the higher counts taken in late planted fields. Moderate to heavy infestations were reported from Republic County, north central and Jackson County. Heavy populations were found in several late planted fields in Neosho and Labette counties.

European corn borers were found in fields of early planted corn in Shawnee, Osage and Franklin counties, east central Kansas counts ranged from 4 to 28% with about 50% pupation. In the southeastern area borers were found as far south as Crawford and Neosho counties where infestations averaged about 4%.—David L. Matthew and Dell F. Gates.

European Corn Borer Prominent in Iowa

AMES, IOWA—The first brood of European corn borer is progressing well. One field in northwest Iowa (Clay County) was 100% infested with 7 to 22 larvae per plant. 70 to 80% of the larvae were still in the whorl on July 15.

Grasshoppers are moving from "unfested" oats and second crop alfalfa into corn, soybeans and gardens. In Story County populations range 5 to 20 hoppers per square yard in alfalfa and pastures.

Corn leaf aphid is building up in corn and grain sorghum, and potato leafhoppers are causing obvious yellowing in alfalfa in southeast Iowa. —Harold Gunderson.

Leafhoppers, Corn Borers Affect Maryland Crops

COLLEGE PARK, MD. — Populations of potato leafhoppers in the state are variable; light in some fields, heavy in others.

European corn borer has been light to moderate in early sweet corn. Generally corn planted after May 1 is free from borer infestation. Pupation is over 80% in Queen Anne's County with some moths emerging. Eggs are being found in small numbers on sweet and field corn in Wicomico County. Corn earworms in early sweet corn ready for the canneries are heavier than usual in Queen Anne's County.—Theo. L. Bissell and W. C. Harding.

Recommendations for New Mexico Pastures Listed by Agronomist

Irrigated pastures will respond to fertilizers better than most crops according to Gordon B. Hoff, extension agronomist at New Mexico A&M College. He says it is important to take a look at the kind of pasture and the condition of the soil before starting to fertilize.

"The pasture mixture—or, to be more exact, the proportion of grasses to legumes—has a lot to do with the fertilizer you should put on," Mr. Hoff explains. "Legumes need lots of phosphate. Grasses, on the other hand, are heavy users of nitrogen. By varying the fertilizer you use, you can help regulate the ratio of grass to legume forage produced."

For pasture mixtures containing balanced amounts of grasses and legumes, use 60 lb. available nitrogen and 45 lb. available phosphorus, the agronomist advises. Mixtures with a high proportion of grasses and light proportion of legumes should be fertilized with 40 lb. nitrogen and 80 lb. phosphate.

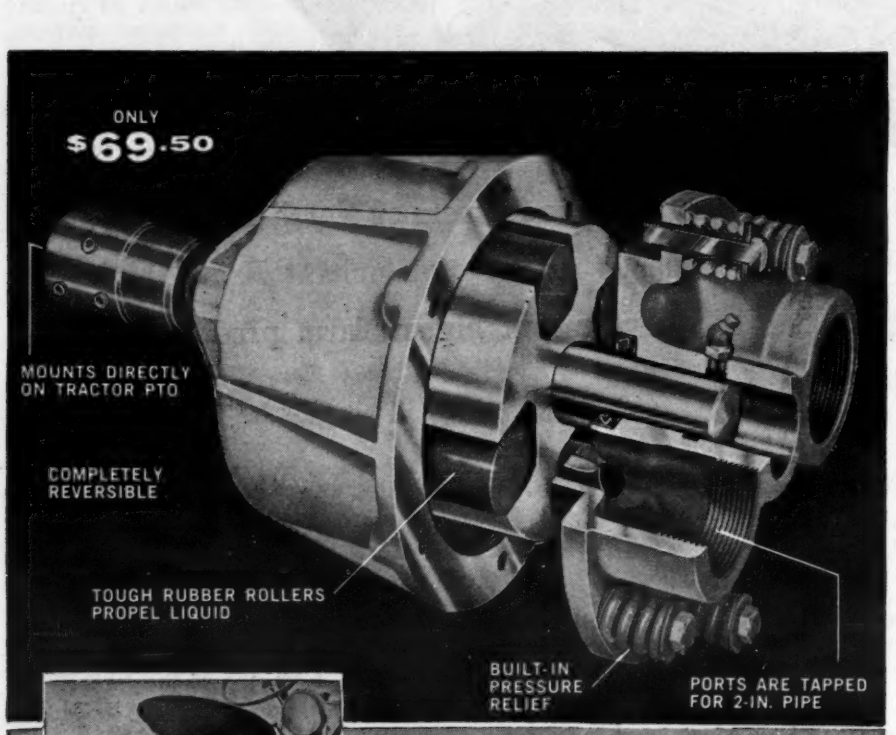
For mixtures that are mostly legumes, but more grass is desired, use 100 to 140 lb. nitrogen applied as several split applications of 35 to 40 lb. each. This will help keep a balance of legumes and grasses. Where a high per cent of ladino clover is desired use up to 100 lb. phosphate.

All the phosphate may be applied in one application each spring, Mr. Hoff says. The nitrogen should be applied in applications of 35 to 40 lb. an acre as the grass shows a need for it. Lighter and more frequent applications work best on sandy soils, while the heavier and less frequent applications are satisfactory on heavy soils.

CONFERENCE SITE

PORTLAND, ORE.—The 1958 regional fertilizer conference of the Pacific Northwest Plant Food Association will be held in Pocatello, Idaho, in late June or early July.

BIG NEW HYPRO PUMP for direct tractor drive



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Poisonous Weeds Killed in New Mexico Range Test Plots

Poisonous plants which cause the death of sheep and cattle each year in New Mexico ranges can be killed effectively by 2,4-D sprays, according to tests conducted by the department of agricultural services at New Mexico A&M College. The two offenders are Pingue (Actinia richardsonii) and rayless goldenrod (Aplopappus drumondi).

The experiments were made on quarter-acre plots at the Floyd Lee sheep ranch at San Mateo, N. M. These plots were sprayed in the fall with two pounds active material (plus one pint kerosene and Triton) in enough water to cover one acre.

Kills, as established in May of the following spring, were satisfactory. Plots were sprayed again in the fall with 2 lb. 2,4-D acid equivalent to control new seedlings and older plants which were not killed earlier.

Rayless goldenrod was also well controlled in demonstrations on 13 half-acre plots on the Norman Libby cattle ranch at Bueyeros, N.M. Three chemicals were applied in summer and fall. One plot in each treatment received both summer and fall applications. All rates were two pounds of acid equivalent to the acre, mixed with enough water to cover the area adequately. One pint of kerosene was added to every 10 gal. water as a spreader.

When 2,4-D was applied in the summer, a 98% kill was effected by early fall. The same kill was found in the spring after 2,4-D had been applied in the preceding fall. All test plots were to be sprayed in the summer with 2,4-D to eradicate young seedlings which germinated in the spring.

TABLE 1—Chemical Control of Pingue on the Floyd Lee Ranch, San Mateo, N.M.

Plot	Material	Percentage of Kill				Mean
1	2,4-D amine	70	94	88	80	83
2	2,4-D ester	86	93	85	84	87
3	MCP	66	54	58	80	65

TABLE 2—Chemical Control of Rayless Goldenrod at the Norman Libby Ranch, Bueyeros, N.M.

Plot	Chemical	Time Applied	% Kill
1	2,4-D amine	Summer	97
2	2,4-D amine	Summer, fall	98
3	2,4-D ester	Summer	96
4	2,4-D ester	Summer, fall	98
5	2,4,5-T amine	Summer	5
6	2,4,5-T amine	Summer, fall	75
7	MCP ester	Summer	35
8	MCP ester	Summer, fall	75
9	2,4-D amine	Fall	99
10	2,4-D ester	Fall	98
11	2,4,5-T amine	Fall	70
12	MCP ester	Fall	45

Boll Weevils in Heavy Concentrations Reported

COLUMBIA, S. C.—Heavy infestation of boll weevils in cotton in the Carolinas continues to be reported, particularly in fields not treated with insecticides.

A typical example is Mecklenburg County, N. C. where some cotton growers "won't get more than 50 lb. an acre this year after the boll weevils are finished," according to George Hobson, county agent.

He said that no spray- or dust-resistant weevils have been found in North Carolina; however, some South Carolina farmers have reported that weevils seem to be developing resistance to certain types of toxicants, and agricultural authorities are investigating these reports.

Meanwhile, livestock in coastal areas of South Carolina are badly infested with screwworms, Carroll J. Livingston, Charleston County agricultural agent, warned owners in an area from Florence, S. C., to Savannah, Ga.

AGRONOMIST NAMED

STATE COLLEGE, MISS.—Kelton Anderson, who has served since 1954 as an associate county agent at Canton, became assistant agronomist of the Mississippi State College Agricultural Extension Service July 1.

Hessian Fly Hits Oregon Grain Fields

PORTLAND, ORE.—Some sections of northern Oregon have been hard hit as a result of the worst Hessian fly outbreak in 20 years and damages have been reported from Goble to Scappoose.

Weakened and broken wheat and barley stems and failure of grain to form heads are common symptoms of Hessian fly damage reported.

The insect-damaged grain has been further weakened by three diseases which have been especially serious this season. Leaf rust, powdery mildew and cereal yellow dwarf have affected spring wheat, barley and oats.

RETAILER MOVES

SAN ANSELMO, CAL.—R. N. Bettini, retailer of fertilizers and garden supplies, has moved from 122 Dominga Ave. in Fairfax to 164 Ridge Road in neighboring San Anselmo.

USDA Revises 1957 Recommendations for Use Of Toxaphene on Livestock

WASHINGTON—The U.S. Department of Agriculture has revised its 1957 recommendations on use of insecticides to again include toxophene for control of certain livestock insects. The action was taken following establishment by the Food and Drug Administration of a tolerance of seven parts per million of toxaphene in the fat of beef cattle, sheep and goats.

The new USDA recommendation, issued as a supplement to Agricultural Handbook No. 120, published in April, includes toxaphene among materials recommended for control of lice, ticks and horn flies on beef cattle and for lice, ticks and sheep ked (ticks) on sheep and goats. Details on the use of various insecticides, including toxaphene, are contained in the Handbook.

USDA stated that the tolerance of seven parts per million of toxaphene in the fat of animals will not be exceeded by producers if the revised recommendations for use of this insecticide are followed. An important restriction is that treatment of animals must be discontinued four weeks or more before slaughter.

No tolerance has been set for the use of toxaphene on swine. Consequently the insecticide is not included among materials recommended for control of lice on these animals. Toxaphene is likewise not recommended by USDA for control of insects on dairy cows, because a tolerance has not been established for toxaphene in milk.

CONSISTENT INCREASES

PORTLAND, ORE.—Consistent increases in forage crop yields through use of commercial fertilizer have been demonstrated during the past two years in northeastern Oregon tests, according to H. E. Cushman, Oregon State College.

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MEETING MEMOS

Aug. 21-22—Shell Nematology Workshop, Orlando Municipal Auditorium, Orlando, Fla.

Aug. 26-28—American Society for Horticultural Science, annual meeting in conjunction with annual meeting of American Institute of Biological Sciences, Stanford University, Palo Alto, Cal.

Oct. 21-22—Fertilizer Section, National Safety Congress, LaSalle Hotel, Chicago.

Nov. 13-15—National Aviation Trades Assn., Annual Convention, Hotel Adolphus, Dallas, Texas.

EDITOR'S NOTE—The listings above are appearing in this column for the first time this week.

July 30-31—Fertilizer Meetings and Experiment Station Tours, Auburn, Ala. and Thorsby, Ala., Sponsored by the Alabama Agricultural Experiment Station and Alabama Soil Fertility Society.

Aug. 13-14—Ohio Pesticide Institute, Summer Meeting, Ohio Agricultural Experiment Station, Wooster, Ohio, J. D. Wilson, Ohio Agricultural Experiment Station, Secretary.

Aug. 14—Connecticut Agricultural Experiment Station Field Day, Mt. Carmel, Conn., Dr. James G. Hersfall, New Haven, director.

Aug. 28-31—Soil Conservation Society of America, Annual Convention, Asilomar, Cal.

Sept. 4—Kentucky Fertilizer Conference, Campbell House, Lexington, Ky

Sept. 4-6—National Agricultural Chemicals Assn., Annual Meeting Essex & Sussex, Spring Lake, N.J., L. S. Hitchner, 1145 19th St. N.W., Washington 6, D.C., Executive Secretary.

Sept. 5-6—Great Lakes States Anhydrous Ammonia Meeting, Michigan State University, East Lansing, Mich.

Sept. 8-15—International Congress of Crop Protection, Hamburg, Germany.

Sept. 24-25—New England Fertilizer Conference, Bald Peak, Colony Club, Melvin Village, N.H.

Oct. 2-4—Eleventh Annual Beltwide Cotton Mechanization Conference, Shreveport, La.

Oct. 3—New Jersey Fertilizer Conference, Rutgers University, New Brunswick, N.J.

Oct. 3-5—Pacific Northwest Plant Food Assn., Annual Convention, Sun Valley, Idaho, Leon S. Jackson, Lewis Bldg., Portland 4, Ore., Secretary.

Oct. 7-8—Western Agricultural Chemicals Assn., Fall Meeting, Villa Hotel, San Mateo, Cal., C. O. Barnard, 2466 Kenwood Ave., San Jose 28, Cal., Executive Secretary.

Oct. 14—Sixth Annual Sales Clinic of the Salesmen's Assn., American Chemical Society, Hotel Roosevelt, New York.

Oct. 15—Association of Official Agricultural Chemists, 71st Annual Meeting, Washington, D.C., Dr. William Horwitz, Box 540, Benjamin Franklin Station, Washington, D.C., secretary-treasurer.

Oct. 17—Conference on Chemical Control Procedures for Industry Chemical Control Analysts, Shoreham Hotel, Washington, D.C. Sponsored by National Plant Food Institute.

Oct. 18—Association of American Fertilizer Control Officials (States Relations Committee, 8 p.m. Oct. 17), Shoreham Hotel, Washington, D.C., B. D. Cloaninger, Box 392, Clemson, S.C., Secretary-Treasurer.

Oct. 29-30—Seventh Annual Northwest Garden Supply Trade Show of Oregon Feed & Seed Dealers Assn., Portland, Ore. Masonic Temple.

Oct. 29-31—Entomological Society of Canada and Entomological Society of Alberta, Annual Meetings, Lethbridge, Alberta.

Oct. 31-Nov. 1—Second Annual Southern Fertilizer Conference and Second Annual Southern Soil Fertility Conference, Dinkler Plaza Hotel, Atlanta, Ga.

Nov. 3-5—California Fertilizer Assn. 34th Annual Convention, St. Francis Hotel, San Francisco, Sidney H. Bierly, General Manager, 475 Huntington Drive, San Marino 9, Cal.

Nov. 6-8—Fertilizer Industry Round Table, Sheraton Park Hotel, Washington, D.C.

Nov. 17-19—National Fertilizer Solutions Assn., Annual Convention, Netherland-Hilton Hotel, Cincinnati, Muriel F. Collie, 2217 Tribune Tower, Chicago 11, Ill.

Dec. 1-3—Southern Seedsmen's Assn., Jung Hotel, New Orleans.

Dec. 2-5—Entomological Society of America, 5th Annual Meeting, Hotel Peabody, Memphis, Tenn., R. H. Nelson, 1530 P St., N.W., Washington 5, D.C., Executive Secretary.

Dec. 2-5—Cotton States Branch, Entomological Society of America, 32nd Annual Meeting, Hotel Peabody, Memphis, Tenn., M. E. Merkl, Box 202, Leland, Miss., Secretary-Treasurer.

Dec. 9-12—Chemical Specialties Manufacturers Assn., Hollywood Beach Hotel, Hollywood, Fla.

Dec. 10-12—North Central Weed Control Conference, 14th Annual Meeting, Hotel Savory, Des Moines, Iowa. Lyle A. Derscheid, agronomy department, South Dakota State College, Brookings, Program Chairman.

Dec. 11-13—Agricultural Ammonia Institute, Seventh Annual Meeting, Hotel Marion, Little Rock, Ark., Jack F. Criswell, Claridge Hotel, Memphis, Executive Vice President.

Dec. 12-13—Beltwide Cotton Production Conference, Hotel Peabody, Memphis, Tenn.

1958

Jan. 7-8—Texas Fertilizer Conference, Texas A&M, College Station, Texas.

Jan. 13-15, 1958—Weed Society of America and Southern Weed Conference, joint meeting, Peabody Hotel, Memphis, Tenn.

Jan. 21-23—California Weed Conference, San Jose, Cal.

Feb. 13-14—Agronomists-Industry Joint Meeting, Edgewater Beach Hotel, Chicago, sponsored by the Middle West Soil Improvement Committee, Z. H. Beers, 228 N. La Salle St., Chicago 1, Ill., Executive Secretary.

March 4-5—Western Cotton Production Conference, Hotel Cortez, El Paso, Texas, Conference Sponsored by the National Cotton Council and the Five State Cotton Growers Assn.

June 15-18—National Plant Food Institute, Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 25-27—Pacific Branch, Entomological Society of America, San Diego, Cal.

July 18-19—Southwest Fertilizer Conference and Grade Hearing, Buccaneer Hotel, Galveston, Texas.

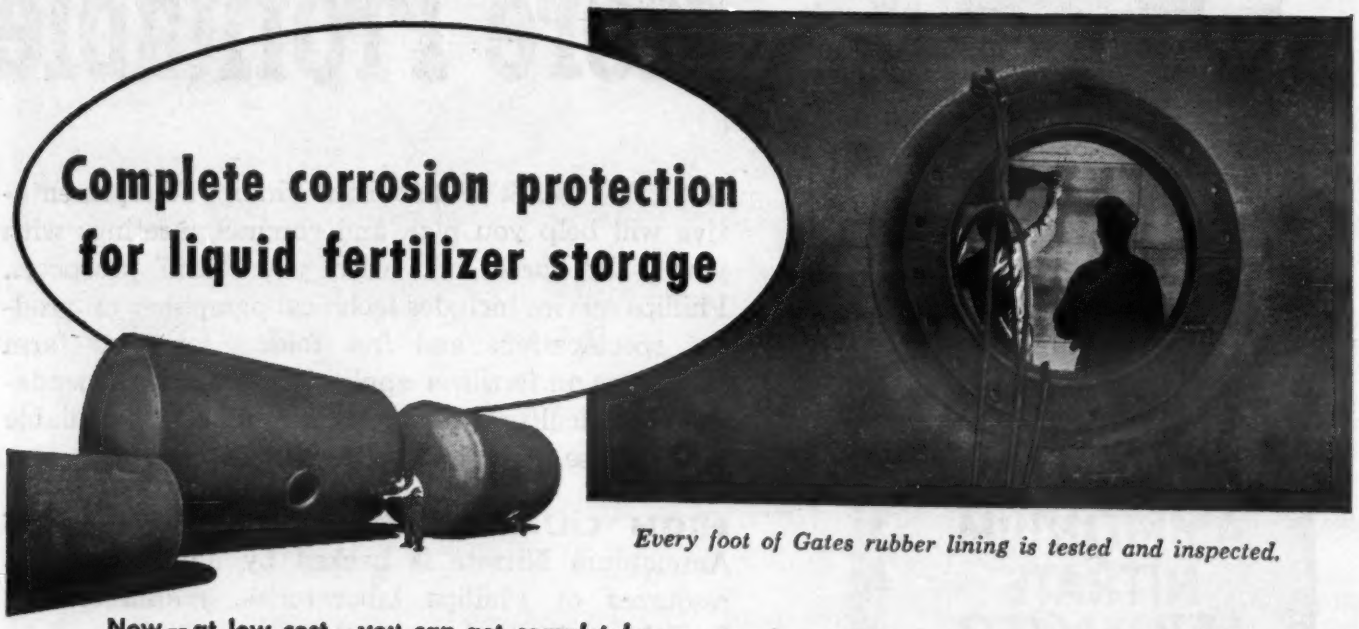
T. G. Granryd

HOUGH APPOINTMENT—T. G. Granryd has been appointed manager of the product improvement department of the Frank G. Hough Co., Libertyville, Ill., according to R. L. Beyerstedt, executive vice president engineering. A former senior engineer, Mr. Granryd was promoted to project engineer early in 1957. He holds a B.S. degree from Norrkoping College and a masters degree from Chalmers University, Guthenburg, Sweden.

Clement M. Brown, Jr. in New Olin Mathieson Post

NEW YORK—Clement M. Brown, Jr., has been appointed regional vice president-Europe for Olin Mathieson International Corp., according to an announcement by H. A. Arnold, president. Olin Mathieson International Corp. is a wholly owned subsidiary of Olin Mathieson Chemical Corp.

Mr. Brown, who will make his headquarters in Paris, will be responsible for the company's chemicals, metals, packaging and pharmaceutical operations in Western Europe. He had been general manager of affiliates and licensees for Olin Mathieson's International Division, which was organized in May as the subsidiary corporation. Before that he had been vice president and general manager of Globe Collapsible Tube Co., New York. He joined Mathieson Chemical Corp. in 1953 as assistant to the financial vice president.



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WESTERN EXPERTS

(Continued from page 1)

the snow melted while the soil remains frozen, I would be afraid of serious loss of fertilizer materials in the run-off water," he said.

However, because of Montana's conditions of limited rainfall, leaching of plant foods is normally not a problem. "Even fertilizers like nitrogen can be applied ahead of crop seeding. Since irrigation is not usually heavy during the period of crop germination and early growth, I doubt that even the irrigated land would seriously lose nutrients from leaching. . . ."

Prof. Hide added that the practice of off-season fertilization could be utilized to a greater extent than it is done at the present. "Much of the sugarbeet land is now fertilized in the fall, using both nitrogen and phosphorus for the crop next season. Dryland crops are grown on the major acreages in the state. However, fertilizers have not been used too extensively on these crops and rates are always low. Consequently, I do not think they offer a big potential market in the near future. All the data we have would indicate that the best application to these dry-land crops is to place the fertilizer in the row with the seed.

"I believe established stands of alfalfa could be fertilized with phosphate any time when the top growth has been cut off; consequently, this would offer an off-season market. Pastures have not generally been fertilized adequately and much of the pastures used in the state are largely grass. Heavy late fall or early spring applications of nitrogen have been used on these areas with favorable results. However, it is probable that more frequent applications during the growing season would tend to level off production and probably increase the efficiency of the return from nitrogen."

As to the off-season fertilization in Wyoming, L. I. Painter, assistant agronomist at the University of Wyoming, Laramie, says that cropping removes from Wyoming soils each year some 13,000 tons nitrogen; and 6,000 tons each of phosphate and potash. Calculating that farmers are replacing some 1,200 tons nitrogen, 3,000 tons P_2O_5, and 50-60 tons potash a year in applications of commercial fertilizers plus the additions of manure, legumes and plant residues, it is doubtful that the nutrient deficit is made up.

"Based on the 1955 irrigated acreages of corn, small grain, sugar beets, potatoes, alfalfa, and wild hay, the potential for fertilizer (according to current recommendations) would be approximately 17,292 tons nitroge and 12,390 tons phosphate." Mr Painter notes that no response ha been obtained from the applicatio of potash, to date.

S. C. Vandecaveye, professor o soils, New Mexico College of Agr culture and Mechanic Arts, State Co lege, N. M. reports that although fe tilizers are applied on alfalfa, cotto and sorghum in New Mexico, "grea er amounts of fertilizers could be use profitably, especially for cotton an sorghum. Except where cotton o sorghum follows alfalfa on irriga ed soils, I believe it would be profi able to use 150 lb. or more N an ac and 80 lb. or more P_2O_5 an acre.

"While phosphorus fertilizers are applied generally for alfalfa it seems to me that the rate used by many farmers is somewhat low. A rate of 80 lb. P_2O_5 an acre each year, or the equivalent for biennial applications or for a single application made for the life of the alfalfa should not be excessive.

"In view of the fact that suitabl mixed fertilizers for these crops ar not easily obtainable, I see no reaso why the phosphorus fertilizers fo these crops cannot be applied in of seasons," the New Mexico specialis concluded.

A study of off-season fertilizatio in Arizona is in the offing at the pre ent time, according to Wallace H Fuller, head of the department o agricultural chemistry and soils a the University of Arizona, Tucso Since the state has long growing se sons and one crop usually follow rather closely on the heels of a pr vious one, conditions are not the sam as in some other states.

"In general, our recommendation are to fertilize directly for the cr which is grown, keeping in mind th history of the cropping practice o the land. There is no doubt that fe tilization is more intense prior t planting of cotton in Arizona, an again prior to the growing of wint vegetable crops. There is no reaso however, to believe that leveling o of the fertilizer market over the ye cannot be accomplished. There much to be done with respect to th time of application of fertilizer t spread out its use over a longer per od of time," he concludes.

FARM BUREAU

(Continued from page 1)

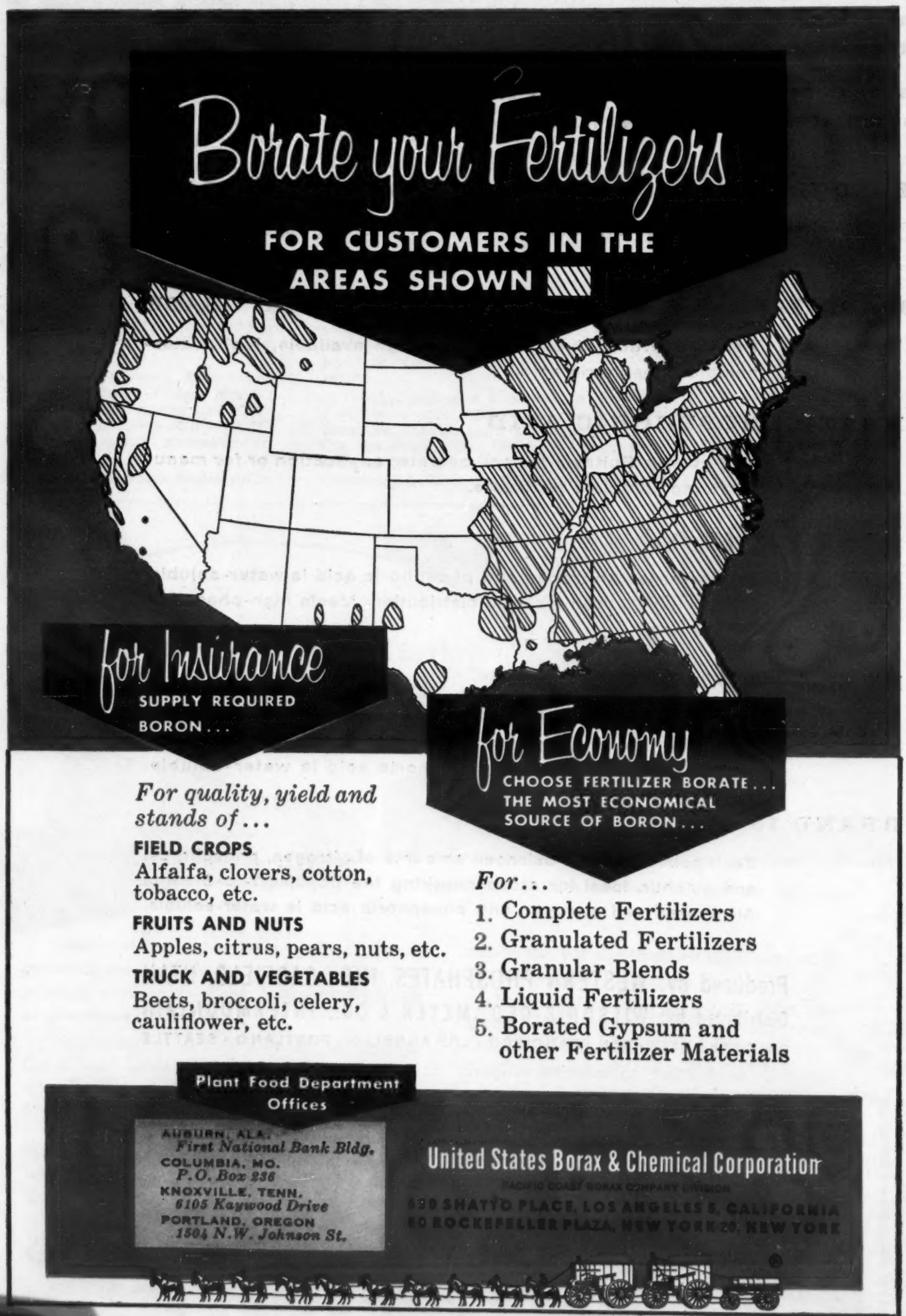
taken up by individual farmers, ma keting cooperatives and others wh would be the investors in the plan and who would agree to purcha their fertilizer requirements from th plant at the regular market price.

On the basis of this guarante market, the report continued, fina cial institutions have indicated th they would be actively interested the financing of the plant. For 150-ton per day factory, total co including land, plant, storage, sta up costs and allowing a liberal pr vision for working capital, would approximately $7,150,000, accordi to the report.

Aqua ammonia could be ma available, and there is opportun to make arrangements to have th anhydrous ammonia converted to d fertilizers for those desiring it. T construct a plant of this type rea in three years, planning and fina cing would need to commence duri 1957, the report concluded.

Budworm Checked

VANCOUVER — A recently co pleted aerial spray program to co trol the blackheaded budworm Vancouver Island has been credit with saving $300 million worth timber. More than 156,000 acres w covered. R. R. Lejeune, federal go ernment biologist in charge of t project, said that "results indic that the budworm populations w adequately controlled throughout spray area."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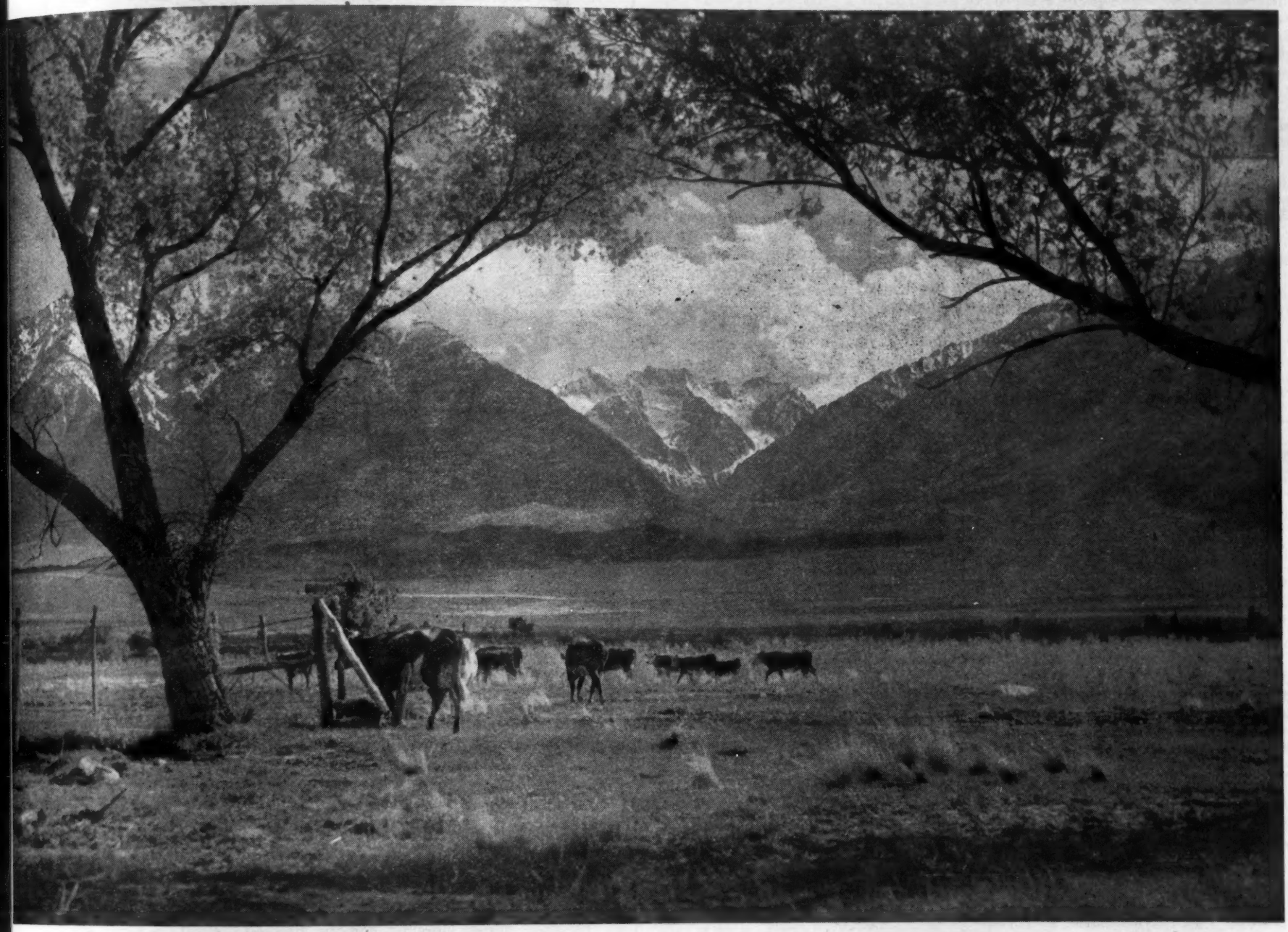
Mountain Pasture Area, Mono County, California. Sierra Nevadas in Background



SHOP TALK

OVER THE COUNTER

By Emmet J. Hoffman
Croplife Marketing Editor

About the least desirable place to locate a garden and farm chemical store would be—or so it might seem—alongside the city dump.

But Ariades Luppi feels that no spot could be more ideal for his fertilizer, insecticide and garden supply store.

Luppi's Nursery, 1200 Old Bayshore Highway, Burlingame, Cal., serves what Mr. Luppi calls the best type of prospect at his location. He says that several times each month, nearly every householder in his trade area comes to the city dump to get rid of his grass cuttings, dead plants and debris. In doing so he has to pass his nursery.

Householders who travel the route often have a trailer attached to their cars, making it very convenient for prospects to haul bags of fertilizers, garden equipment and other bulky products. The householder's mind, Mr. Luppi says, is for the moment on his garden and yard needs, and with his means of transportation at hand, what better place would there be for stopping at a garden supply store?

Mr. Luppi gave up what he thought at first would be a fine location on an arterial highway to situate himself in this dump-side spot. So far he feels he has not made a mistake in his choice.

Elsewhere in this issue, the attention of readers is called to off-season fertilization articles and features which can be found in Croplife. This is the third in a series of four issues carrying articles with special emphasis on off-season fertilization.

The purpose of the series is to promote the increased use of fertilizer on pasture and range land in areas where agronomists have found it to be practical and effective.

Dealers are invited to carefully look over the material in this special section on off-season fertilization and use the information available to spread the gospel of this worthy subject. It will mean more profits in the long run.

Grassland Development Requires Much Nitrogen

By JOSEPH D. CAMPBELL

Agronomist, Plant Food Division
Olin Mathieson Chemical Corp.
Baltimore, Md.

Many elements are required for plant growth, but nitrogen assumes a key position. Crops generally contain more of this element than any of those supplied by the soil. None of the nitrogen required for growing plants is supplied by the soil per se; it comes from decaying organic matter or from fertilizers in forms such as anhydrous ammonia, urea, ammonium or nitrate salts. All of this nitrogen had its origin in the gaseous form found abundantly in the atmosphere.

Unlike elements such as phosporus and potassium, nitrogen must be fixed either by micro-organisms or chemical plants. Until economical production became feasible, nitrogen was the most expensive element in fertilizers. Because of this, great emphasis was placed on legumes as nitrogen fixers. In spite of prodigious efforts, legumes did not then, and will not now, begin to meet the needs of this element. Nitrogen has been and still is, universally deficient. The quantity of nitrogen presently being used in hay production is especially low.

Although one-third of all the cultivated land in the United States is devoted to hay and pastures, and nitrogen is the key element, very little is used. The average actual yield of hay in this country in 1950 was 1.4 tons an acre; only a half a pound of nitrogen an acre was used. Table 1 shows what might be expected if more adequate amounts were used.

In addition to improving hay and pasture yields from the use of nitrogen, protein content can be increased. One of the chief reasons cattle feeders often prefer legumes is due to their higher protein content. Legumes contain about 15% protein, but grass cut for hay usually contains only 5-8%. If an economical program could be developed to bring the protein content of grass up to, or higher than legumes, this would represent a real step forward in agriculture.

This question might be posed: "Is the protein produced by increased nitrogen as good as that from legumes?" Many experiments have been

(Continued on page 16)

Good Pasture Management Boosts Income

Herbicide and Fertilizer Recommendations Present Marketing Opportunities

Western range and pasture lands offer some tremendous areas for additional sales of fertilizers and weed control chemicals. This is obvious from the standpoint of the number of acres involved, but also from the potential profit to be realized by both the industry and the rancher who utilizes the materials.

Below are comments on what has been done or might be done to increase incomes from greater attention to pasture maintenance in some western areas.

IDAHO

In Idaho, suggestions for fertilization on pastures are entirely different in the northern and southern parts of the state, so the following suggestions for pasture fertilization and weed control are divided accordingly by Robert E. Higgins, extension agronomist at the University of Idaho, Boise.

He said that the state has made no recommendations for fertilizer applications on rangeland because little work has been done on this subject. However, Charles Painter, soils specialist at the University, says that uses of from 30 to 40 lb. actual nitrogen an acre should be adequate on good range in the higher rainfall areas.

For fertilization of pastures in non-irrigated pastures in northern Idaho, the following recommendations are made by the University:

Apply 150 lb. gypsum an acre every year or 300 lb every other year in the fall or early spring. When ammonium sulfate or single superphosphate is used, the application of gypsum may be reduced or deleted depending on the rate used.

In areas of known boron deficiency substitute borated gypsum for regular gypsum.

Apply 30-50 lb. actual nitrogen an acre. The lower rate is for coarse textured drouthy soils. On fine textured soils apply in the fall if early pasture is desired the following spring. On coarse textured soils subject to leaching or flooding, apply early in the spring.

On bottom land high in organic matter apply 40-60 lb. available P_2O_5 an acre.

Experiments to date, have not indicated that economic beneficial results will be obtained from the use of potash on mineral soils. However, on organic soils responses have been indicated from the use of 40-60 lb. K_2O an acre.

In general it is suggested that where there is a limited supply of barnyard manure it should be used on the cash crops. If, however, more is available it should be applied to the new pasture and hay seedings.

When manure is used, reduce the amount of actual nitrogen supplied as commercial fertilizer by 4-5 lb. an acre for each ton applied.

On irrigated lands, these recommendations are offered:

Apply 150 lb. gypsum an acre every year or 300 lb. every other year in the fall or spring. When ammonium sulfate or single superphosphate is used the application of gypsum may be reduced or deleted on the rate used. In areas of known boron deficiency substitute borated gypsum for regular gypsum.

Apply 40-60 lb. actual nitrogen an acre; 20-30 lb. to be applied in the fall and 20-30 lb. around the middle of June the following summer.

If late growth is desired, apply an additional 20-30 lb. nitrogen around the first of August.

On bottom land high in organic matter, apply 40-60 lb. available P_2O_5 an acre.

Experiments, to date, have not indicated that economic beneficial results will be obtained from the use of potash on mineral soils. However, on organic soils responses have been indicated from the use of 40-60 lb. of K_2O an acre.

In general it is suggested that where there is a limited supply of barnyard manure it should be used on the cash crops. If, however, more is available it should be applied to the new pasture and hay seedings. Manure favors late summer growth. When manure is used, reduce the amount of actual nitrogen supplied as commercial fertilizer by 4-5 lb. an acre for each ton applied.

In fertilizing new seedings, hay or pasture, apply a minimum of 100 lb. ammonium sulfate prior to seeding. If response has been obtained from the use of phosphate apply a minimum of 40 lb. an acre of available P_2O_5. (An application of 125 lb. an acre of 16-20-0 will meet the above requirements.)

Manure, where available, is of value in establishing new seedings.

Southern Idaho

On irrigated pastures in the southern part of the state, apply 80 lb. of available P_2O_5 an acre each year or at a rate based on soil tests. The proportion of legume to grass can be modified by fertilizer treatment. A high phosphate and a medium to low nitrogen level favors legumes. A high nitrogen level favors the grass.

A minimum of 40-60 lb. actual nitrogen an acre should be applied each year. This should be applied as a split application, one-half in the fall and the other half around the middle of June.

If late pasture is desired, an additional 20-30 lb. nitrogen should be applied around the first of August.

Results of a pasture fertilizer experiment at Caldwell, Idaho, have shown that the most uniform production of grass throughout the growing season was obtained from five monthly applications of 20 lb. nitrogen each beginning about May 1.

In general it is suggested that where there is a limited supply of manure it should be used on the cash crops. If, however, more is available it should be applied to the pasture. Manure favors late summer growth. When manure is used reduce the amount of actual nitrogen supplied as commercial fertilizer 4-5 lb. for each ton of manure applied an acre.

Information obtained from investigations on Mountain Meadows shows increased yields from the use of nitrogen and phosphorus. The greatest increase is from nitrogen.

New seedings on pastures should receive 40 lb. nitrogen and 80 lb. available P_2O_5 (or rate based on soil test) prior to seeding pasture mixtures. When such mixtures are established with a companion crop on fertile soil omit the nitrogen.

Weed Control in Pastures

Grasses should not be treated until 6 weeks after emergence. Treat at 1 lb. equivalent, in the amine form, to the acre. In the second year perennial grasses may be treated at 2 lb. acid equivalent an acre if noxious weeds are present. For annuals continue using 1 lb. The brome, fescue, and wheat grasses are tolerant to these treatments. Blue grasses are less tolerant.

On established grass pastures, spray with 2 lb. 2,4-D amine in 30 gal. water an acre for control of broadleaf weeds.

In applying dinitro herbicides on grasses (use only the selective dinitros), do so two weeks after emergence or when grasses are 2-4 inches tall. The weeds must be small having not more than 2 to 3 true leaves. These materials work best during warm weather. At high temperature rates should be reduced to prevent excessive injury to the grass. The average application rate of the 13% materials is 3 qt. an acre in 50 gal. water.

Since applications can be made when the grass is much younger, these materials frequently may be more satisfactory than 2,4-D for early germinating annual weeds, but the dinitros are ineffective in perennial weeds.

Dinitro herbicides on legumes, (only the selective dinitros should be used) apply after true leaves have formed on legumes. Most legumes can be treated at 3 qt. in 50 gal. water an acre without serious injury. (Alfalfa can stand much higher rates.) Weeds must be small for effective control. Dinitros work best during warm weather. At high temperatures rates should be reduced to prevent excessive injury to the crop.

These are the only chemicals which can be used on legume-grass mixtures.

In mowing where weeds are abundant, new seedings should be clipped for weed control. Best results are obtained if clipping can be delayed until 8-10 weeks after seeding. Clip to height of about 3 inches; this will result in reduced shading and a temporary reduction in competition for moisture, thus enabling weak seedlings to become better established.

Earlier clipping may result in damage to seedlings and may make an additional later clipping necessary to prevent seed production of the annual weeds.

WYOMING

Wyoming farmers have shown increased awareness of soil-fertility problems of late years. Fertilizer sales increased 400% from 1943 to 1953, but the average amount applied per harvested acre is still very low.

Most of the soils in Wyoming are low in available phosphorus and nitrogen. A summary of the analyses of soils from the cropland areas in Wyoming during the 10-year period 1944-1954 showed that about 70% of the soils needed phosphorus for most field crops. Field experiments have indicated significant economic responses from use of both nitrogen and phosphorus fertilizers. To obtain more information regarding the use of ferti-

Brush Control in Idaho

Kind of Brush	Spray Mixture	Remarks
Susceptible		
Alder	4 lb. acid equivalent amine	Spray to complete coverage, respray any regrowth in late spring or early summer of following year.
Elderberry	2,4-D + 5 gal. diesel oil	
Honeysuckle	+ 4 to 5 cups of a detergent	
Nine bark	"soap" powder + 95 gal. water	
Ocean spray		
Spirea	*3 lbs. acid equivalent ester	
Willow	2,4-D + 100 gal. water	
	or	
Intermediate		
Blackberry		Spray to complete coverage, respray regrowth each year in late spring or early summer till desirable degree of control is obtained. Two to three sprayings should be anticipated.
Ceanothus		
Huckleberry	*3 lbs. acid equivalent ester	
Gooseberry	2,4-D + 100 gal. water	
Quaking aspen	or	
Red Osier dogwood	*2 to 3 lb. acid equivalent	
Service berry	2,4-D + 2,4,5-T mixtures	
Syringa	+ 100 gal. water	
Twin berry	or	
Wild cherry	*2 to 3 lb. acid equivalent	
(not choke cherry)	ester 2,4,5-T + 100 gal. water	
Wild currant		
Wild rose		
Willow		
Resistant		
Choke cherry		Spray to complete coverage. Control will be difficult. Three or more sprayings will probably be necessary.
Oregon boxwood	*3 lb. acid equivalent ester	
Snowberry	2,4,5-T + 100 gal. water	
Thorn		

*Ester prohibition: In the counties of Clearwater, Latah, Lewis and Nez Perce, the use of any formulator of ester 2,4-D, ester 2,4,5-T or ester MCP is prohibited by the state department of agriculture from May 15 to September 1 of each year. In these counties use the amine 2,4-D treatment spray prior to May 15 (if sufficient foliage has developed) or use one of the dormant treatments with ester 2,4,5-T and diesel oil.

For the control of big sagebrush and Wyethia, we recommend spraying with 2 pounds of 2,4-D amine in 30 gallons of water per acre for ground application; 2 pounds of 2,4-D heavy ester in 5-10 gallons of oil per acre for aerial application. This spray should be applied when the brush is in bloom, usually in late May and June. Sagebrush control with chemicals is profitable only where a good understory of grass is present.

zers on field crops in Wyoming, a rtility research program has been progress since 1951.

Irrigated pastures are an important part of the agriculture in Wyoming, where livestock constitutes a major part of the state's economy. The quality of irrigated pastures varies considerably from one area to another and depends largely on past management practices. In some areas, irrigated pastures are native mountain meadows consisting primarily of rushes and sedges, which are fairly high in protein but very low in yield. They respond very little to fertilizer applications primarily because of the lack of water control by the farmers. In areas of the state where good soil and water management practices are employed, the meadows consist largely of timothy, orchardgrass, and alsike and ladino clovers. These pastures yield fairly well and respond very well to commercial fertilizers.

The effects of various fertilizers on he yield and composition of irrigated asture was obtained in a two-year xperiment on the Frank Curtis anch in Sheridan County, Wyoming. he lack of late irrigation water in his area limited the yield data to one utting per season and consequently he yield and the increase due to the ertilizer are somewhat smaller than ould normally be expected.

These pastures were seeded about 5 ears before the experiments, and the orage was about half legume and alf grass. The principal species were imothy, orchardgrass, alsike clover, nd ladino clover. The yield of the orage increased markedly with the pplications of nitrogen, being more han doubled by the application of 54 b. and almost tripled by application f 108 lb. nitrogen an acre.

There was only a slight yield increase due to application of phosphate lone. Stand counts were made in 954 on the regrowth following the rst cutting. The yield increase due o the combination of nitrogen and hosphate was only slightly larger han that due to the application of itrogen alone. Nitrogen alone increased the percentage of grass and ecreased the percentage of legumes n the stand. This decrease in the percentage of legumes in the stand was roportional to the rate of nitrogen pplication. The percentage of legumes in the stand decreased from 5% to 4% or less by the application f 108 lb. nitrogen an acre.

This change in species composition ccurred with the application of nitrogen regardless of the rate of application of phosphate. The protein content of the forage remained relatively constant although the percentage of eumes in the forage was decreased rom 35 to 2% by application of nitrogen. In pastures where legumes are ot present, the application of nitrogen generally increases the protein ontent of the forage.

Fertilizer recommendations—for irrigated pastures depend quite largely on the fertility of the soil and the pasture composition. Where nitrogen and phosphate are both deficient in the soil, the species composition of the pasture can be regulated with fertilizers.

If the pasture is primarily grass, very little response will be obtained rom applying phosphate. If the water control is adequate, nitrogen should e applied at the rate of 80 to 160 lb. er acre with the total amount being dded in two or three applications uring the growing season. On grass egume pastures the application of 60 o 80 lb. of P_2O_5 is recommended every or 4 years on low-phosphate soils.

MONTANA

Weed Control

Range lands in Montana can be greatly improved through control of a number of weeds that reduce the utility of thousands of acres in the tate. The agricultural experiment station at Montana State College, Bozeman, says that of the perennial weeds that infest the state, Canada thistle is more prolific than any other. This weed is intermediate in time of emergence and grows rapidly after getting started, the station explains in a bulletin. It crowds out most other plants, and because of its seeding habit, vigorous growth and extensive horizontal and vertical underground root system, control or eradication is difficult.

The station points out that good competitive crops for Canada thistle are alfalfa, winter wheat and seeded grass pasture. These crops begin growth earlier in the spring than Canada thistle, and alfalfa recovers more quickly from mowing.

Canada thistle is somewhat resistant to 2,4-D, the station says. Two to three pounds 2,4-D an acre should be used for control of Canada thistle in fence rows and on wasteland. Regrowth should be treated again in the fall. As Canada thistle plants mature beyond the bud stage, 2,4-D becomes less effective and the higher rate of 2,4-D should then be used.

Here is a suggested control program offered by the Montana experiment station:

1. Cultivate every 21 days during growing season and fertilize if necessary; seed winter or spring wheat; spray with .75 to 1 lb. 2,4-D an acre in the spring. Cultivate or plow immediately after harvest and cultivate every 21 days until freeze-up.
2. Seed alfalfa or alfalfa-grass mixture, and cut for hay 2 or 3 times each season. Plow up after 3 or 4 years when the alfalfa stand thins out, and crop with wheat and spray for elimination of remaining plants.
3. Seed a recommended grass or grass mixture for pasture; spray with 2,4-D 8 weeks after emergence of grasses using 1 lb. an acre; spray with 2,4-D at 2 lb. an acre each year thereafter at early bud stage, and on regrowth in late summer or early fall until control is obtained.

Another unwanted plant in Montana is field bindweed, sometimes called wild morning-glory and creeping jenny, also has an extensive root system. Growth of this weed begins late in the spring. It is a vigorous competitor and grows continuously from emergence until after the first fall frosts. The seed of field bindweed often live many years in the soil. When old patches are controlled, new seedlings will cause reinfestation if they are not detected early and controlled.

Winter wheat and rye are the most effective competitive crops for controlling bindweed. These crops begin growth earlier in the season than bindweed. Applications of 2,4-D can be combined with these and other grass crops, such as grass pasture, for effective control.

Intensive cultivation is effective in controlling bindweed. New shoots should be cut off about every 14 days or 10 days after emergence. Eradication of bindweed by intensive cultivation requires 2 to 3 years. It

(Continued on page 16)

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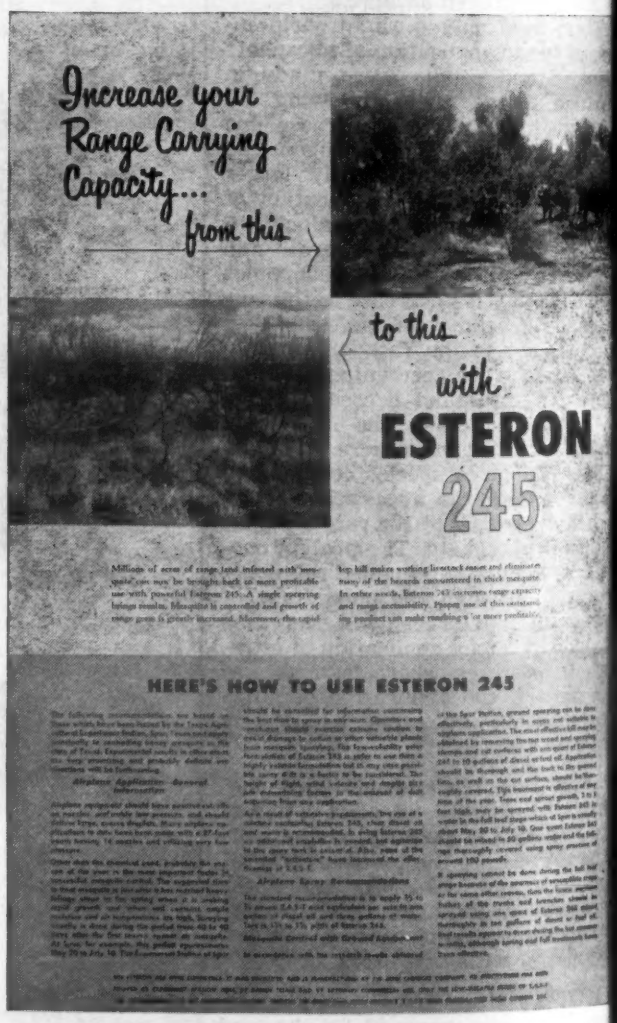
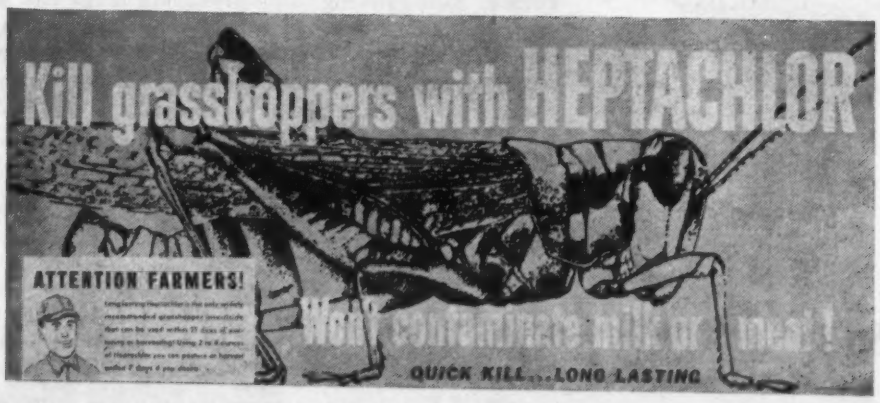
FERTILIZERS

BALFOUR, GUTHRIE & CO. offers a variety of sales helps for its dealers, some of which are illustrated here. Above, left, is a mailing piece which opens out as shown. Over all dimensions, 25½"x11½". Folded, it is 8½x11½". At right is 2 col.x8" newspaper ad for local use. At left is large colored poster to hang on wall of store. It carries samples of different grades of granular fertilizer products. Check Numbers 1, 1A and 1B on coupon.

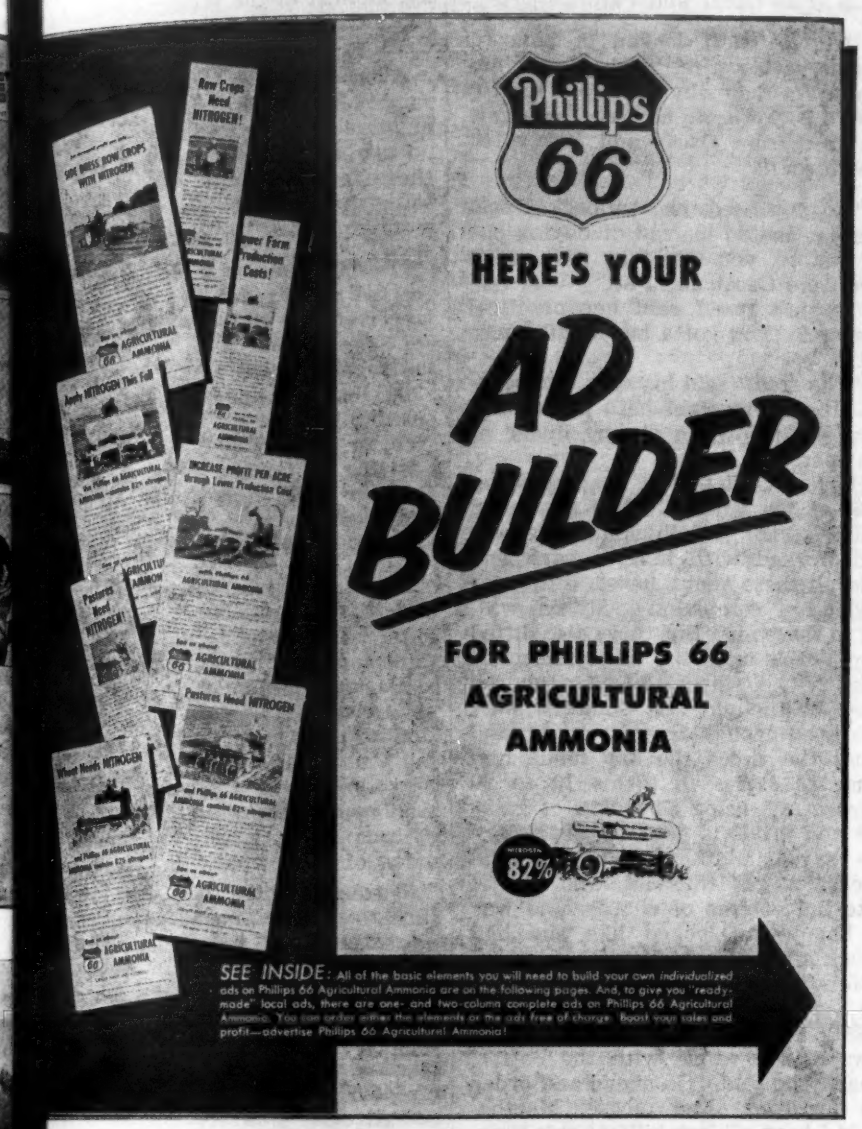


DOW CHEMICAL CO. has available to its dealer a colorful folder describing mesquite weed contro with "Estron 245". Folded size is 3¾ x 8½", an opened out, as shown above, it is 11 x 17". Suitabl for mailing or for poster use in store. Check No. on coupon.



VELSICOL CHEMICAL CORP. has made up eye catching posters featuring the use of its product Heptachlor, for grasshopper control. The poster printed in green, is 25" long and suitable fo window, counter, or bulletin board display. Chec No. 3 on coupon.

s for Richer Sales Fields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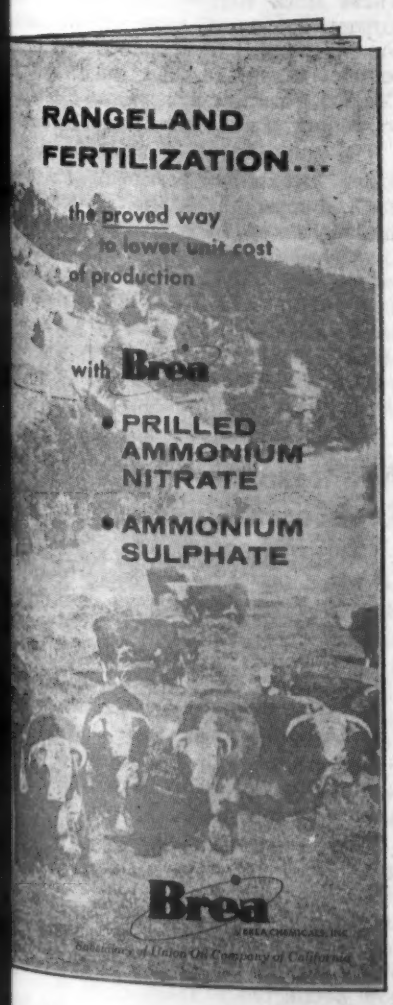
FOR PHILLIPS 66 AGRICULTURAL AMMONIA
82%
SEE INSIDE: All of the basic elements you will need to build your own individualized ads on Phillips 66 Agricultural Ammonia are on the following pages. And, to give you "ready-made" local ads, there are one- and two-column complete ads on Phillips 66 Agricultural Ammonia. You can order either the elements or the ads free of charge. Boost your sales and profit—advertise Phillips 66 Agricultural Ammonia!

PHILLIPS CHEMICAL CO. has made up a large group of mats for use by its dealers in advertising locally. Various insignia with Phillips trade mark, headings for ads, copy, illustrations, and layouts for one and two-column ads are included in the booklet shown above. Check No. 4 on coupon.



☆ ☆ ☆

BREA CHEMICALS, INC., has prepared an attractive booklet describing the use of its prilled ammonium nitrate and ammonium sulphate for rangeland fertilization. Illustrated throughout, the booklet is thorough in its treatment of the subject. Suitable for mailing or utilization as a display in the store, the booklet is instructive and tells a convincing story about the economics of rangeland fertilization in the western areas of the United States. Check No. 6 on the coupon.

☆ ☆ ☆

AMERICAN POTASH & CHEMICAL CORP. offers the above advertising mats to its dealers. Describing the benefits of potash on "Whatever the Crop," the ads are designed to be educational and informative. Check No. 5 on the coupon below.

Please send me the items checked:

BALFOUR, GUTHRIE & CO.
- ☐ No. 1, Window Banner
- ☐ No. 1A, Store Poster
- ☐ No. 1B, Advertising Mat

DOW CHEMICAL CO.
- ☐ No. 2, Mesquite Control Folder

VELSICOL CHEMICAL CORP.
- ☐ No. 3, Grasshopper Control Banner

PHILLIPS CHEMICAL CO.
- ☐ No. 4, Newspaper Advertising Mats

AMERICAN POTASH & CHEMICAL CORP.
- ☐ No. 5, Advertising Mats

BREA CHEMICALS, INC.
- ☐ No. 6, Rangeland Fertilization Folder

Name of Firm ☐ FERTILIZER DEALER ☐ PESTICIDE DEALER

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Doing Business With

Oscar & Pat

By AL P. NELSON
Croplife Special Writer

When Harley Klett came in for his mid-morning coffee in the big, well-applianced farm kitchen, Martha, his strong, buxom and capable wife, said, "Harley, how about buying some fertilizer for fall application? Have you thought about it?"

Tanned, chunky Harley Klett watched his wife pour the steaming amber liquid into the big white coffee cup. "Aw shucks, there's still time to think about that next month. This is only July. Besides, sometimes I think this fall application of fertilizer is just a sales idea of the dealers, like Oscar and Pat. They're hollerin' about it all the time."

"Not Oscar," his wife reminded him. "The only thing he hollers about is money. Remember that time we let our bill go for 31 days and he phoned us about it."

"If that guy was in business for himself he'd try to do business with one sack of fertilizer at a time in his store," Harley said. "He's that tight." Then both he and his wife laughed at the picture of Oscar in a store with one bag of fertilizer, and happy that at last he was running the business his way, and that it was the only way.

Martha Klett poured a half cup of coffee for herself, then spread out the local weekly in front of her husband. "Well," she said, "look here. If you order your fertilizer now from Oscar and Pat for fall delivery, you get an extra dollar a ton discount by Aug. 1, and a sealed envelope giving you a regular discount, plus a brand new pocketbook with your name engraved on it."

Harley Klett frowned. "There's that Pat promoting again. I'll bet he didn't get this idea through without havin' Oscar strip a few gears. Pat never leaves us alone for a single month. Always wants us to buy somethin'."

"But you need a new pocketbook, Harley," persisted his wife. "Honestly, you've had your old one for eight years and it's all discolored. I've mended the corners many times. It just won't do much longer."

Harley Klett pulled out a misshapen, knobby, faded leather billfold from his rear hip pocket. It was scuffed in many places, and the discoloration from sweat made it look ancient. He patted it fondly. "Good old pocketbook," he said. "What's wrong with it? It looks pretty good to me." He laid it on the table and gazed at it fondly.

"What's wrong with it? Why it's a wreck, that's what it is. I'm ashamed to see you pull it out when we shop."

Harley Klett frowned. "Why be ashamed? It's not how a pocketbook looks, but what's inside it that counts. Don't you understand that, woman?"

"Of course," his wife returned spiritedly. "But there comes a time when a pocketbook gets so worn that it's time to buy a new one. That time arrived with you—about five years ago."

Harley Klett looked at the battered billfold on the table. Slowly he shook his head. "You women don't understand what a pocketbook means to a man. He looks at it and thinks of all the work and sweat and worry he's put in to get a few green backs to put into it. He thinks how proud he is when he can open that pocketbook and pay for fertilizer, seeds, tractors, barns, cows and his family's needs. And then when he thinks of how many thousands of dollars went into and outa that pocketbook since he's had it, and, Martha, he gets proud and scared all at the same time. That's why a man likes to keep a good pocketbook year after year. It's like an old and trusted friend."

"Yes, but men need new pocketbooks now and then," insisted Martha, "just like they need the newer types of fertilizers for special crop needs."

Harley shook his head and continued to reminisce. "You women are all alike. You're too much for style, style, style, all the time. Men collect their old hats and you women want us to throw them away. Then you want us to throw away our old pocketbooks and get new ones. Why, yuh ought be darn glad we stick to our possessions. Suppose, we threw away our wives fast like you want us to throw away our old hats and pocketbooks."

"Oh, but that's different," Martha said.

Harley cleared his throat. "That's what you women think. Oh, well, if it's that important to you, go ahead and buy me a new pocketbook. I'll break it in gradually wearing it to church on Sundays."

"Oh, I don't mean you should buy one," Martha said. "Let's order our fall fertilizer and get a free pocketbook from Oscar and Pat."

Harley Klett looked in amazement at his wife. "Holy Cow," he said. "Is that why you want me to get a pocketbook, because I can get it free from Oscar and Pat with fertilizer?"

"No, you need the new pocketbook, Harley, and so instead of buying one at a store, you might as well get it free from Oscar and Pat."

"It ain't free," said her practical husband. "You gotta buy fertilizer to get it."

"It is free," said his wife stubbornly. "It says so right here in the ad." And she pointed a stubby finger at the spot.

Harley Klett took a long, studying look at his wife. Through his mind flitted a string of thoughts, how she had worked with him in barn and field all these years, never asking for pay, never complaining, always willing to serve him. But there also flitted through his mind the times she made him change shirts to go to church when he thought last Sunday's shirt was good enough to wear twice, and about the times she had made him chase to stores in towns 10 to 20 miles away, using $4 worth of gasoline and meals to get bargains where she saved $3.25 over home town prices, or got thimbles, and plastic cake knives free of charge, and was so happy she looked like she had struck a gold mine.

He weighed all these things as men are very apt to do, without saying much, remembering the marriage vows of the worse with the better. Wearily he said, "Go ahead and order the fertilizer. And please, Martha, could I have a black billfold this time. I'm a little tired of brown."

"All right, Harley," Martha beamed. "I knew you'd see it that way. You're so smart, dear."

SIGN CLEANER—Dr. B. R. Bertramson, chairman of the Washington State College department of agronomy, dusts off the college's new agronomy farm sign so it showed big as life for the farm dedication and cereal field day at Pullman, Wash., July 10. The cereal day was held on the new experiment station agronomy farm, 2½ miles south of Pullman. Visitors saw an expanded cereal research program made possible by the 220-acre farm. Over $85,000 of the farm's purchase price was contributed by wheat growers and the wheat industry to help WSC obtain the much-needed cereal research laboratory.

Insect Survey of Oregon Forests Started

PORTLAND — The annual insect survey of Oregon forest lands was started July 1. The first step is a flight over 27 million acres by plane.

The infested areas then will be checked on the ground by W. J. Buckhorn and Peter Orr, entomologists with the Pacific Northwest Forest Range Experiment Station.

Biggest concern in western Oregon is the balsam wood aphid, which has infested 150,000 scattered acres of fir. The survey west of the Cascades is expected to be completed by the end of July. A check then will be made for spruce budworm in eastern Oregon.

Buys Aircraft

MODESTO, CAL.—The East Side Mosquito Abatement District has purchased an aircraft to be used for chemical spraying operations to control the spread of mosquitoes in the area. A special craft designed for work in the mountains has been purchased from the Serv-Aero Engineering Co. of Dos Palos at a cost of $7,300, and was manufactured by the Call Aircraft Co. of Wyoming.

HEADS AGRONOMY FARMS

STILLWATER, OKLA. — Lavoy I. Croy, 1955 agronomy graduate of Oklahoma State University, has been appointed superintendent of the university's agronomy farms near Stillwater. Mr. Croy has been in charge of small grains field research at the farms west of the campus for the past two years. He is completing requirements for a master's degree.

Nitrogen Boosts Coastal Bermuda Grass Profits In Texas Experiments

Heavy applications of nitrogen fertilizer must be used on irrigated Coastal Bermuda grass in order to obtain maximum returns on investment, according to tests conducted by Richard A. Schwartzbeck, assistant agronomist of the Winter Garden Agricultural Experiment Station at Crystal City, Texas.

Average yields for 1955 and 1956 ranged from 2.88 tons air-dry forage an acre on irrigated plots receiving no nitrogen to 13.03 tons an acre on those fertilized with 600 lb. elemental nitrogen (1,800 lb. of 33.5% ammonium nitrate).

Besides the check plots which received no nitrogen and those which received 600 lb., four other groups of check plots received elemental nitrogen at rates of 120 lb., 240 lb., 360 lb., and 480 lb., respectively, during each of the 2 years. The nitrogen was applied, following each cutting of Coastal Bermuda grass, in four equal applications. All plots received an annual application of 200 lb. of 45% superphosphate.

Mr. Schwartzbeck calculated costs and returns per acre for each of the different levels of fertilization for established pastures of irrigated Coastal Bermuda grass. In making the calculations, he used average production costs of farms in the area growing Coastal Bermuda grass under irrigation—$78 a ton as the cost of treble superphosphate, $95 as the cost of ammonium nitrate, and a forage value of $30 a ton.

Throughout the test, the net return to the acre increased constantly as successively heavier applications of nitrogen were made, indicating that—under the cost-price relationships used—additional profits could be obtained even if more than 600 lb. of nitrogen were used. A net return of $46.60 an acre was obtained when no nitrogen was applied, but a net return of $265.60 was realized with an application of 600 lb. elemental nitrogen.

Although Mr. Schwartzbeck used a forage value of only $30 a ton, net returns would have been greatest at the 600-lb. nitrogen level even if forage had been valued at $20 a ton. These data suggest that unless the farmer has more remunerative uses for his capital, it may be unwise to restrict use of fertilizer on irrigated Coastal Bermuda grass in an attempt to reduce farm operating expenses.

The net return of $2.97 for each dollar invested in fertilizing, irrigating and top-dressing the Coastal Bermuda grass was the highest when 240 lb. elemental nitrogen were applied to the acre. This return compares with $1.17 when no nitrogen was used, and $2.12 when 600 lb. were applied. Yields of forage continued to increase beyond the 240-lb. an acre level, but at a diminishing rate.

Additional Firms Register in California

SAN FRANCISCO—Nine additional firms have registered with the Bureau of Chemistry of the California State Department of Agriculture to sell chemical agricultural fertilizers in the state, during the period since March 20. Five of the firms are located in northern California, two in the southern half of the state, and two are based out of state, in Yuma, Ariz., and Chicago.

There have also been six firms registering to sell agricultural minerals, including four in northern California and two in southern California. Four additional firms classified as auxiliary plant chemical registrants are also now permitted to make sales in California, all but one of which are located out of state, in Indianapolis, Portland, Ore., and New York.

FARM SERVICE DATA

Extension Station Reports

Ways to use grass as a conservation tool are listed in a new circular published by the Oregon State College Extension Service.

Grass and legumes, planted together, form a "holding corporation" to hold soil firmly against erosion, the circular points out. This combination also helps build back organic matter that may have been lost from the soil, and enriches the land for following crops.

Illustrations in the circular show what can happen to land when the grass cover is lost, and point out how land can be recovered through correct use of grass and legumes. The circular's author, E. R. Jackman, Oregon State College extension range crops specialist, also lists a variety of ways to develop and manage grasslands for maximum soil protection.

★

Seeding of annual legumes on foothill ranges to improve quality of feed shows promise in tests conducted this year in Tulare County, California, by the agricultural extension service.

"Even though it has been a generally poor year for growth of legumes, due to light rainfall poorly distributed, results have been favorable in the tests," reports Ralph L. Worrell, farm adviser.

Rose clover, sub clover, and bur clover seed was broadcast over the range. Then about 600 lb. per acre of gypsum was applied in strips across the seeded areas.

In the fertilized strips the stand and growth of legumes was good and the plants are expected to seed themselves satisfactorily. In the areas where the legumes received no sulphur from the gypsum, the stand of plants was only fair and growth weak and poor color, said Mr. Worrell.

★

"Mountain Meadow Improvement in Wyoming" is the title of a bulletin (No. 350) recently issued by the University of Wyoming experiment station. In the bulletin, Rulon D. Lewis, U.S. Department of Agriculture soil scientist, reports four major research findings for improving hay and pasture production in the state's mountain meadows.

Water control, says Mr. Lewis, is essential. Field results show that intermittent rather than continuous wild-flood irrigation was necessary to establish and maintain good stands of high-yielding forage species.

Introducing better forage species also resulted in meadow improvement.

Nitrogen fertilization showed promise in experiments by increasing yields and quality of hay when used with both higher-yielding forages and adequate water control.

Finally, experiments showed that the best yields of high-protein hay resulted when higher-producing forage grasses were cut when the seed was at the soft-dough stage.

★

Medusa head and barbed goat grass, introduced into California in the 1880's, have developed into two serious range pests in northern California.

Typical of the program in force against them is that being carried on in Amador County where from 2,000 to 4,000 acres of rangeland have been lost to the grasses.

There, the University of California agricultral extension service, the State Department of Agriculture, the California Division of Forestry and the county agricultural commissioner are engaged in a cooperative effort to control the grasses.

Several control methods have been tried but none has been completely successful, the authorities say. Most promising has called for burning the existing stand, seeding with subterranean clover and fertilizing with single super phosphate. Seed lies dormant in the ground for four years, requiring a control program to be carried on for at least five years.

Soil sterilants effectively kill the weeds, according to Robert Plaister, Amador County farm adviser, but he said they also prevent other plants and clovers from growing.

Members of the agricultural commissioner's staff have sprayed roadsides with good results. Dalapon is used early in the season and diesel oil later as the plants near maturity.

Two Promoted at Western Phosphates

SALT LAKE CITY, UTAH—Two promotions at the Garfield, Utah plant of Western Phosphates, Inc., have been announced by Elwood Lentz, vice president and general manager of the phosphatics materials facility.

James A. Malloch, a graduate of Massachusetts Institute of Technology, and former maintenance superintendent, was named plant engineer. Frank W. Bless, formerly chief process engineer was promoted to production superintendent. He is a graduate of Drexel Institue of Technolgy.

PICKLED HOPPERS

SACRAMENTO—The current grasshopper infestation of many northern California counties is providing a harvest for Lu Sine, Orland, Cal., contractor. Mr. Sine has developed a device which sucks the hoppers from the fields after which they are deposited in a pickling solution in 50-gallon barrels. He ships the pickled hoppers to eastern states for fish bait. Buyers pay $1 lb. for the insects. Mr. Sine has harvested as many as nine barrels a day.

CALIBRATION CIRCULAR

FT. COLLINS — Colorado State University has published a circular on calibration of farm sprayers. O. J. Trenary, the University's extension agricultural engineer, the author, emphasizes the importance of accuracy in spray applications. He tells how to calibrate the sprayer so it will deliver the exact amount of chemical needed.

This shipment of 50% Heptachlor concentrate formulated with

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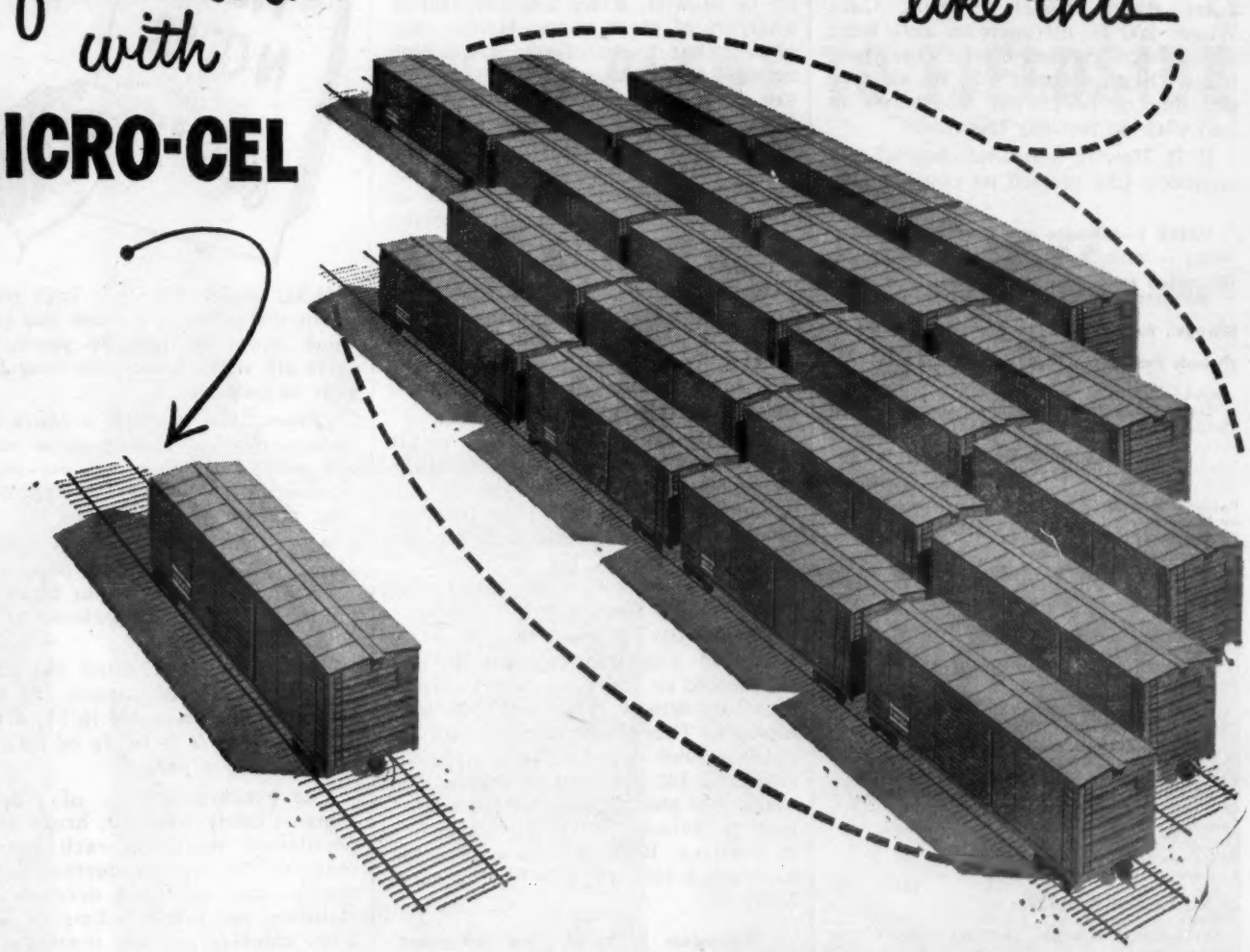
—can provide application quantities like this



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JOSEPH A. CAMPBELL

(Continued from page 9)

done to answer this question. Tables 2, 3 and 4 represent the results of work reported by Blaser, et al (1).

A distinct advantage of the high nitrogen grass method was greater ease of maintaining good stands. Also, it enabled 26% more steers to be carried to the acre. Even considering the higher daily liveweight gains obtained from grass-legume mixtures, there was a 13% increase in total liveweight gains to the acre in favor of the nitrogen fertilized grass.

Blaser et al (1) foresee for extensive hay production, that grass-legumes will continue to have an important place but recommended increased nitrogen fertilization. On higher valued land under more intensive hay production, they suggest that a high protein grass program might be practical. As the population increases, the latter method will doubtless become of very great importance.

Workers at the Coastal Plain Experiment Station, Tifton, Georgia, commenced an animal feeding experiment in 1949. Burton (2) reported on the results as shown in Table 5.

Similar results have been obtained in cooperative studies done in Colorado (3) on mountain meadows at the John Rahm Ranch, Parlin, Colo. Where 200 lb. nitrogen an acre were applied on irrigated brome grass pastures, they produced 4.73 lb. an acre per day of beef gain, compared to 2.65 with no fertility treatment.

E. R. Hewitt, a retired chemist and engineer, has carried on considerable private research on high protein hay production at a minimum of cost. On formerly run-down, hilly, stony land in the Catskills, which averaged a little over a ton an acre of low-quality hay, he now is profitably producing more than three tons to the acre per year of hay, which analyzes over 15% protein.

TABLE I—Nitrogen and Crop Production in the U.S.A.*

(Estimated from given applications of N with the other elements in adequate supply) YIELDS		Hay (Tons Per Acre)
Nitrogen Rates	160	4.0
	120	3.4
(Pounds Per	80	3.0
	40	2.9
Acre)	0	2.1

*Data taken from "Fertilizer Use and Crop Yields in the U.S." USDA, 1954.

TABLE II—Daily Gains of Steers on Various Pasture

Pasture Species or Mixtures	Daily Gains in Pounds per Steer (Mean all years **)
Orchardgrass plus nitrogen*	1.07
Tall fescue plus nitrogen* ..	0.89
Orchardgrass—Ladino clover	1.19
Tall fescue—Ladino clover .	1.01
Ky. Bluegrass—Va. white clover	1.13
Orchardgrass — lespedeza—white clover	1.18

*216 pounds (N) per acre per year, 4 split applications.
**1950-1956.

TABLE III—Carrying Capacity of 700-pound Steers on Various Pastures

Pasture Species or Mixtures	Animal Days Grazing per Acre (Mean all years **)
Orchardgrass plus nitrogen*	310
Tall fescue plus nitrogen* ..	411
Orchardgrass—Ladino clover	258
Tall fescue—Ladino clover ..	313
Ky. Bluegrass—Va. white clover	280
Orchardgrass — lespedeza — white clover	204

*216 pounds (N) per acre per year, 4 split applications.
**1950-1956.

TABLE IV—Liveweight Gains Per Acre for Various Pastures

Pasture Species or Mixtures	Liveweight Gains per Acre (Mean all years **)
Orchardgrass plus nitrogen*	360
Tall fescue plus nitrogen* ..	393
Orchardgrass—Ladino clover	333
Tall fescue—Ladino clover .	333
Ky. Bluegrass—Va. white clover	335
Orchardgrass — lespedeza — white clover	268

*216 pounds (N) per acre per year, 4 split applications.
**1950-1956.

TABLE V—Beef Production from Coastal Bermuda Growing on a Tifton Sandy Loam Soil at Tifton, Georgia

Annual fertilization*	Pounds of animal gain per acre obtained in: 1950	1951	1952	Average
No N (nitrogen)	294	230	252**	259
50 lbs. N/A ..	330	301	279	303
100 lbs. N/A ...	526	466	451	481
200 lbs. N/A ...	685	697	669	784
Crimson clover .			365	365
5% LSD	83	135	87	92
C.V.	10.3	18.5	11.5	13.7

*500 lb./A of 4-8-6 in 1950. 0-10-20 to make a 4-1-2 ratio on grass pastures annually beginning in 1951. Half of N was applied in spring and half in mid-summer. 500 lb./A of 0-10-20 annually for clover.
**Some N from a 5% stand of bitter blue lupine.
Beef gains are the average of gains obtained from three two-acre pastures stocked at close to full capacity by adding or removing steers as needed throughout the summer.

He likes the plant roots to go into dormancy in the late fall, well stocked with nitrogen. The timing is very important in order to achieve maximum results at a minimum of cost.

Many sources of nitrogen were tested by Hewitt. After a great deal of analyses of plant tissue, Hewitt concluded that forms of nitrogen which release the ammonium (NH_4+) ion are preferable over those which release nitrate ($NO_3—$). His tests convinced him that grass prefers, and preferentially absorbs, ammonium over nitrate nitrogen. Work done at the University of Missouri reported by Sheldon (8) strengthens this observation.

In view why so little nitrogen has and is now being used when results generally are so favorable. Until recently, nitrogen has been an element in relatively short supply, but more important, it has been expensive.

Howard (7) wrote that as a result of work done by the German chemist, Fritz Haber, commercial production of ammonia began in 1913. A few ammonia plants were built in this country, but the really big developments commenced just prior to World War II continuing up to the present.

Horner (6) reported that by early 1957 the amomnia capacity in the U.S. would be approximately 4,757,000 tons, or equivalent to 3,917,000 tons nitrogen. This would represent an expansion since Jan. 1, 1951, of approximately 2,495,000 tons nitrogen. The number of plants increased from nineteen in January, 1951, to thirty-five in January, 1955, and were expected to reach a total of fifty-two by early 1957.

Nitrogen is now plentiful, and the cost to the farmers is low in terms of other items he has to buy. According to Cornell University, the price received for a five-gallon can of milk in 1920 would buy 10 lb. of nitrogen; in 1955 the same can of milk would buy 32 lb. of nitrogen—a 320% gain. Since then the price of nitrogen fertilizer has been substantially reduced. With nitrogen in plentiful supply and reasonably priced, the future for high-protein hay looks encouraging indeed.

A high nitrogen application in the form of the cation ammonium (NH_4+) tends to depress the absorption of other cations such as calcium, magnesium or potassium; in the form of the anion nitrate ($NO_3—$) it depresses the absorption of other anions such as phosphorus ($PO_4—$). Because of these facts, it will be necessary to maintain a good balance of the other nutrient elements.

Just as there is nutrient balance in plants so there is in animal feeding. Cooper (4) has indicated, for example, that high calcium and nitrogen in relation to low phosphorus in succulent legumes tends to encourage bloat in animals. A diet of high-protein hay alone might, for instance, lead to a deficiency of calcium. This, doubtless, explains why good dairymen have found from experience the value of certain feeding combinations.

There is a great need for more integrated research on fertilizer and animal feeding. This shoul further be tied in with cost studies in order to point the way to more prosperous agriculture. This is a challenge which should be met with concerted efforts by the fertilizer industry, agriculture colleges and similar groups.

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What about 1977? It isn't so far in the distant future, when you really think about it. Just 20 years, and, after all, it does not take long for a year to pass by.

From 1950 to 1955, a short five years, our population grew some 14 million. At that rate our population in 1977 will be well over 200 million.

At present our farm population is about 13% of our total population. By 1977, it looks as if our farm population will be somewhere around 10% of the total.

In 1920 we harvested 3¼ acres of crops for each person. By 1950 this had been reduced to 2¼ acres, and by 1977 it is likely to be only 1⅓ acres per person.

The nation's acreage of cropland remains fairly constant, hence as the population increases each person's share of the acreage decreases. This means that the food necessary to maintain our present diets of about 3,100 calories per day must be produced on fewer acres per person and at higher rates of production per acre.

An understanding leadership is to be desired for these U.S. We have no reserves of cropland to draw upon to feed our anticipated population. The fertility of the nation's soil must be preserved, and it cannot be preserved if farmers have to over-crop to get the necessary cash to buy the necessary equipment.

The only solution seems to be the development of programs designed to preserve our soil's fertility, which farm and city folk alike support and look upon as an investment in our future and the future of succeeding generations.

WEED CONTROL PAYS

STILLWATER, OKLA.—The value of chemical treatments for control of weeds in strawberries was demonstrated in 1956 trials at Oklahoma A&M College. Savings in hand labor amounted to $50 an acre for the season when 2,4-D sprays were used.

RECOMMENDATIONS

(Continued from page 11)

is usually best to combine cultivation for 1 year with cropping and spraying rather than to have the ground idle for the period necessary to eradicate by cultivation.

Field bindweed is quite susceptible to 2,4-D, and top-growth is easily controlled. However, eradication of the underground root systems with 2,4-D is difficult. Treatments should be made when regrowth is about 4 to 6 weeks old. A rate of .75 to 1 lb. 2,4-D will give good topkill and control of field bindweed in wheat crops. Two pounds an acre should be applied on noncropped areas or in established perennial grass stands.

The Montana station offers a number of suggested control programs for field bindweed. These are listed as follows:

1. Cultivate 3 to 4 inches deep 10 days after each emergence for 1 complete season; seed winter wheat or rye; fertilize if needed. Spray bindweed with .75 lb. 2,4-D an acre when the grain is well tillered. Cultivate or spray again with 1 to 2 lb. 2,4-D an acre after harvest to control regrowth. Spring wheat or barley may be used, but are less effective.

2. Seed a recommended pasture grass or a recommended grass mixture; fertilize if necessary. Apply .75 lb. 2,4-D an acre to control bindweed about 8 weeks afted emergence of grasses. Retreat with 2,4-D the next season at 1 to 2 lb. an acre as often as necessary.

Whitetop, or hoary cress, begins growth early and grows vigorously during the cool part of the season. It is, therefore, a serious weed in spring-sown small grains, pastures, and alfalfa. Blooms appear only once each season, but this is quite early. Viable seed has been found on whitetop as early as June 2 in some locations. During the hot weather in July and August this plant usually becomes dormant or grows slowly.

Late-sown crops, such as corn, barley, or beans, are effective competitors. Cultivation or plowing is necessary prior to planting late crops for best results. Perennial grasses and winter and spring wheat are also effective if 2,4-D is used for selective treatments.

One pound 2,4-D an acre should be used in small grains. Applications should be made when plants are in the bud stage and before blooming. Apply 2 lb. 2,4-D an acre on whitetop in noncropped areas or in established perennial grasses.

Suggested control programs include the following:

1. Cultivate every 21 days during the first season, and seed winter or spring wheat. Apply 2,4-D at 1 lb. an acre when whitetop is at the bud stage in the spring. Plow or spray after harvest to control regrowth.

2. Plow in late May, or if earlier, cultivate 4 to 6 inches deep. Prepare seedbed and plant corn. Cultivate corn for grassweed control and when whitetop begins, make an application of 2,4-D using drop nozzles and directing the spray so that only the bottom part of the corn stalk is covered. Use 2,4-D amine at 1 lb. an acre. The 2,4-D treatments may be varied by applying before plowing and seedbed preparation. Plowing should be delayed for a week after spraying.

3. Seed pasture grass after a thorough spring cultivation. Apply 1 lb. an acre of 2,4-D about 8 weeks after emergence of grass to control whitetop. Provide the necessary fertilizers and management to keep grass vigorous and treat with 2 lb. 2,4-D an acre each year until control is obtained.

4. Rates of 20-30 lb. 2,4-D applied in late fall are effective. Some retreatment may be necessary the following year.

Alabama Fertilizer Conference Scheduled For July 30-31

AUBURN, ALA.—The role of irrigation and fertilization in increasing forage and row crop yields in Alabama will be studied by members of the Alabama fertilizer industry during a conference at three locations of the Alabama Polytechnic Institute Agricultural Experiment Station system July 30-31.

The occasion is the annual Alabama Fertilizer Conference sponsored by the experiment station and the extension service in cooperation with the Alabama Soil Fertility Society. Meetings will be held at the Main Station here, Foundation Seed Stocks Farm near Thorsby, and Chilton area horticulture substation near Clanton.

Talks of interest to fertilizer manufacturers and salesmen are scheduled at the opening session in Duncan Hall. Registration gets under way at 9:30 a.m. and the morning program opens at 10 a.m.

Opening session speakers include Dr. E. V. Smith, dean and director, API School of Agriculture and Agricultural Experiment Station; Dr. R. W. Pearson, principal soil scientist, Soil and Water Conservation Division, U.S. Department of Agriculture; Dr. Fred Adams, experiment station associate soil chemist; William F. Nichols, Sylacauga Fertilizer Co.; E. M. Evans, experiment station associate agronomist; Dr. L. E. Ensminger, experiment station soil chemist; C. E. Floyd, director of chemical control, Virginia-Carolina Chemical Corp.; and J. C. Lowery, extension service agronomist.

A special feature of the opening session will be the presentation of the National Plant Food Institute Award in agronomy to an outstanding student of the School of Agriculture by Frank Boyd, Montgomery, president of the Alabama Soil Fertility Society.

On the afternoon of July 30, the group will tour research areas. They will see experiments on irrigation and fertilization of forage crops for dairy cattle, fertilizer experiments on row crops and tests of adaptability, fertilization and management of turf grasses. Dr. R. D. Rouse, experiment station soil chemist, will be in charge of the tours. Dr. W. R. Langford, experiment station associate agronomist, and G. H. Rollins, experiment station associate dairy husbandman, will show forage crops for dairy cattle. Dr. D. G. Sturkie, experiment station agronomist, will explain fertility and turf grass experiments.

The July 31 program opens at 9:30 a.m. at the Foundation Seed Stocks Farm. Speakers will include George T. Sharman, Jr., farm superintendent; Dr. Pearson; H. A. Weaver, agricultural engineer, USDA Agricultural Research Service; Dr. Clarence Scarsbrook, experiment station associate soil chemist; and O. L. Bennett and B. D. Doss, soil scientists, USDA Agricultural Research Service. During a tour of the farm, visitors will see production of high quality foundation seed, research on irrigation of forages and irrigation and high nitrogen on cotton.

The conference will close with an afternoon tour of the Chilton area horticulture substation conducted by Supt. C. C. Carlton. The group will observe research on fertilization, irrigation and varieties of horticultural crops.

NEW SPRAY REGULATIONS

WINNIPEG—New air regulations approved by the Canadian government will permit farmers owning airplanes to spray and dust other producers' crops. Until the change was announced the farmer with an airplane could only treat his own acreage in this manner for pest control. Now he can spray or dust within a radius of 25 miles of his own farm.

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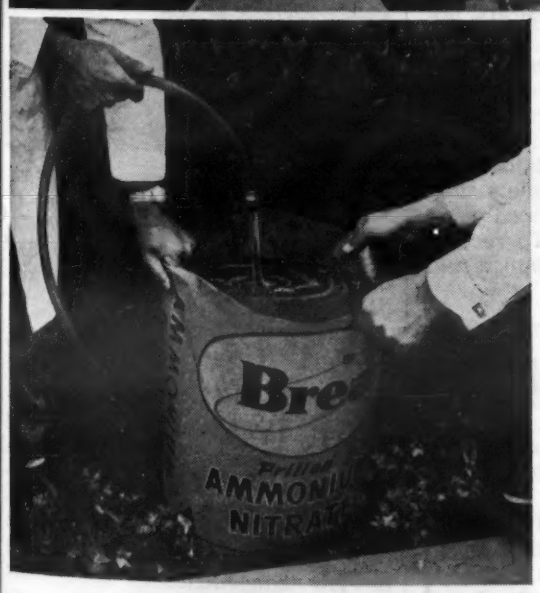

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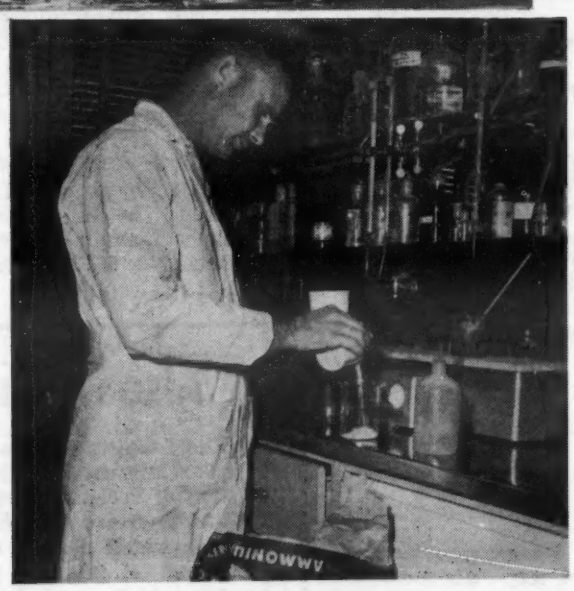

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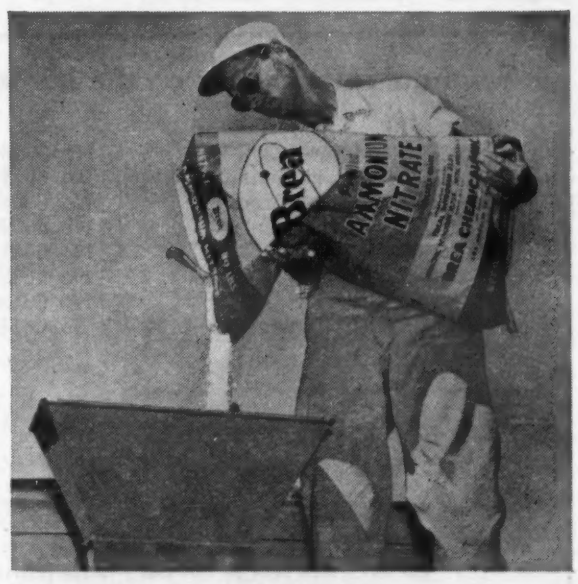

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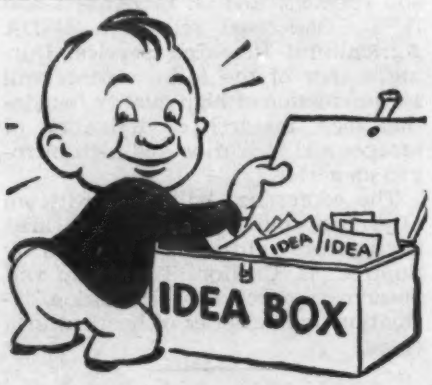

What's New...

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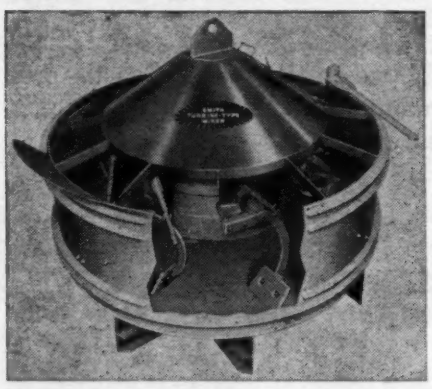
You will find it simple to obtain additional information about the new products, new services and new literature described in this department. Here's all you have to do: (1) Clip out the entire coupon and return address card in the lower outside corner of this page. (2) Circle the number of the item on which you desire more information. Fill in your name, your company's name and your address. (3) Fold the clip-out over double, with the return address portion on the outside. (4) Fasten the two edges together with a staple, cellophane tape or glue, whichever is handiest. (5) Drop in any mail box. That's all you do. We'll pay the postage. You can, of course, use your own envelope or paste the coupon on the back of a government postcard if you prefer.

No. 6611—Weed Control Guide

The soil building division, Cooperative GLF Exchange, Inc., has available its 1957 chemical weed control guide. A copy is available without charge. Check No. 6611 on the coupon and mail it to Croplife.

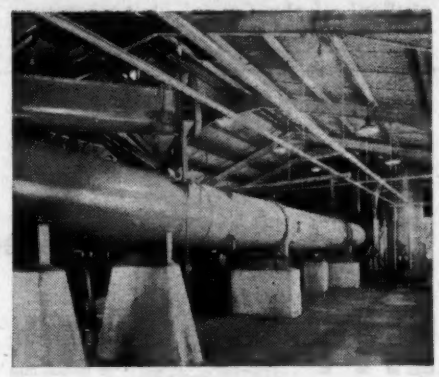
No. 6612—Turbine Type Mixer

The T. L. Smith Co. has introduced a mixer incorporating new design principles. The mixer is said to fit into spots too low for many types of mixers and "mixes so thoroughly that it actually homogenizes the materials." The mixer has a doughnut shaped mixing drum. The drive mechanism is located in the center of the drum. The drum shape is claimed to provide a "live mix" and eliminate dead centers in the mixing area. The mixer has application in the fertilizer and chemical industries, the manufacturer states, and it is possible to use a forced air exhaust so as to dissipate fumes and harmful gases. The blade action gives virtually instantaneous mixing for dry batches, according to the company. The mixer is made in three sizes: 17½-, 35-, and 53-cu. ft. dry batch. It can be used as a stationary or portable mixer. Secure details by checking No. 6612 on the coupon and mailing it to Croplife.



No. 6614—Waste Drying System

The Standard Steel Corp. has developed a new drying system for treatment of sewage sludge and industrial wastes. The basic unit in the system is the Standard-Hersey rotary dryer which can handle sludge of 75-80% moisture, reducing it to 6% moisture, according to company officials. The officials state: "A saleable product of uniform particle size, friable and non-dusty in character, is obtained. This product can be treated to a definite pH (by adding ferrous sulphate to lower pH or lime to raise it) and can be improved as a fertilizer by easy addition of nitrogen and phosphorus. The process lends itself to simple addition of chemicals. The dryer serves as an excellent mixer and the sludge is a good carrier of additives because of its bulky nature—much surface area is available." In the picture the pug mill (upper left) feeds sewage sludge to the rotary dryer at the Broadway sewage disposal plant at Corpus Christi, Texas. The screw conveyor going to the pug mill brings recycled dried product to mix with the wet feed which is delivered to the pug mill on a belt conveyor. Secure details on the system by checking No. 6614 on the coupon and mailing it to Croplife.



No. 6613—Gravity Application

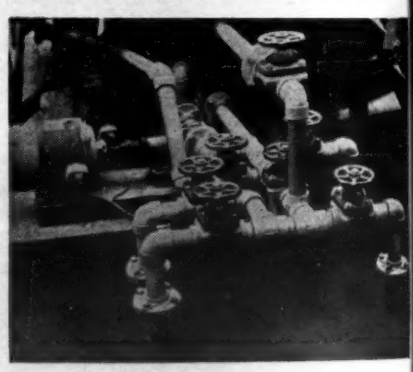
A new gravity application kit, designed to provide more accurate aplication of fumigants, has been developed by Fabricated Metals, Inc. The unit attaches to a tractor. Liquid flows by gravity from a supply tank through metering tubes that regulate rate of flow to ground applicators. From two to six outlet headers may be used. The kit is described in a data sheet available free. To receive it check No. 6613 on the coupon and mail it to Croplife.

No. 6602—Fertilizer Bulletins

Fertilizer application is the subject of three new farm service bulletins offered to agents, dealers and farmers in the Middle Atlantic area by the I. P. Thomas Division of the Pennsalt Chemicals Corp. "Side Dressing Fertilizer," "Rotation Fertilization," and "Economics of Fertilizer Applications" give detailed recommendations on the various elements required during the growing season, types of commercial fertilizers, and methods of application to supply sufficient plant food for profitable yields. A reference table shows average composition of 39 common fertilizer materials. The bulletins are available by checking No. 6602 on the coupon and mailing it to Croplife.

No. 6607—Piping Systems

Details of polyvinyl chloride pipe, fittings, flanges and valves for use with liquid fertilizers are available in literature prepared by Tube Turns Plastics, Inc. The picture gives a close up view of the firm's piping that serves one of the liquid fertilizer mixing tanks owned by the Washington Cooperative Farmers Assn. Advantages claimed for the piping are: Resists the attack of corrodents; is unaffected by weather conditions; requires no paint; and has long life. Secure details by checking No. 6607 on the coupon and mailing it to Croplife.



No. 6604—Carrier for Liquid Toxicants

New literature has been prepared by the Minerals & Chemicals Corporation of America on its product, Attaclay, a carrier for liquid toxicants. Advantages claimed for the product are: Great sorptive capacity in high or low concentrations, with either viscous or "watery" poisons; produces dust bases, wettable powders that are dry, free-flowing, lump-free; and rapid, uniform impregnation. Secure the literature by checking No. 6604 on the coupon and mailing it to Croplife.

No. 6726—Portable Ribbon Mixers

The Young Machinery Co. announces that a new line of portable heavy duty horizontal ribbon mixers is in production with .34 cu. ft. to 20 cu. ft. working capacity. The mixers are available in carbon steel, stainless steel, and monel metal with or without heating or cooling jackets and move freely on heavy duty industrial casters. They are furnished with single or double ribbon or rib-

(Continued on page 23)

No. 6608—Technical Bulletin

A technical bulletin (No. 5) on urethane (ethyl carbamate) has been prepared by the organic chemicals division, Food Machinery & Chemical Corp. According to the company's announcement, there is a "growing interest in urethane" in the field of agricultural chemicals (including weed killers, fungicides and insecticides). Secure the bulletin by checking No. 6608 on the coupon and mailing it to Croplife.

No. 6609—Ant Film

Insecticide formulators, distributors and dealers can now obtain copies of a new color-sound film on ant control, prepared recently by the University of Georgia extension service. The film is described as being "non-commercial, interesting, and authentic, and it affords a means for training personnel in modern ant control methods, or providing a factual background for ant insecticide sales promotions." The film covers the life cycle, habits, and control of ants. Copies are available in black and white as well as color and it has been cleared for TV use. The running time is 13½ min. Copies of film may be obtained on a free, loan basis. For full details check No. 6609 on the coupon and mail it to Croplife.

Also Available

The following items have appeared in the What's New section of recent issues of Croplife. They are reprinted to help keep retail dealers on the regional circulation plan informed of new industry products, literature and services.

Send me information on the items marked:

- ☐ No. 5726—Mixers
- ☐ No. 5733—Attachment
- ☐ No. 6588—Sulfur Brochure
- ☐ No. 6598—Insect Control
- ☐ No. 6602—Bulletins
- ☐ No. 6603—Data Bulletin
- ☐ No. 6604—Carrier
- ☐ No. 6605—Fly Killer
- ☐ No. 6606—Cotton Miticide
- ☐ No. 6607—Piping Systems
- ☐ No. 6608—Bulletin
- ☐ No. 6609—Ant Film
- ☐ No. 6611—Weed Control Guide
- ☐ No. 6612—Mixer
- ☐ No. 6613—Gravity Application
- ☐ No. 6614—Drying System

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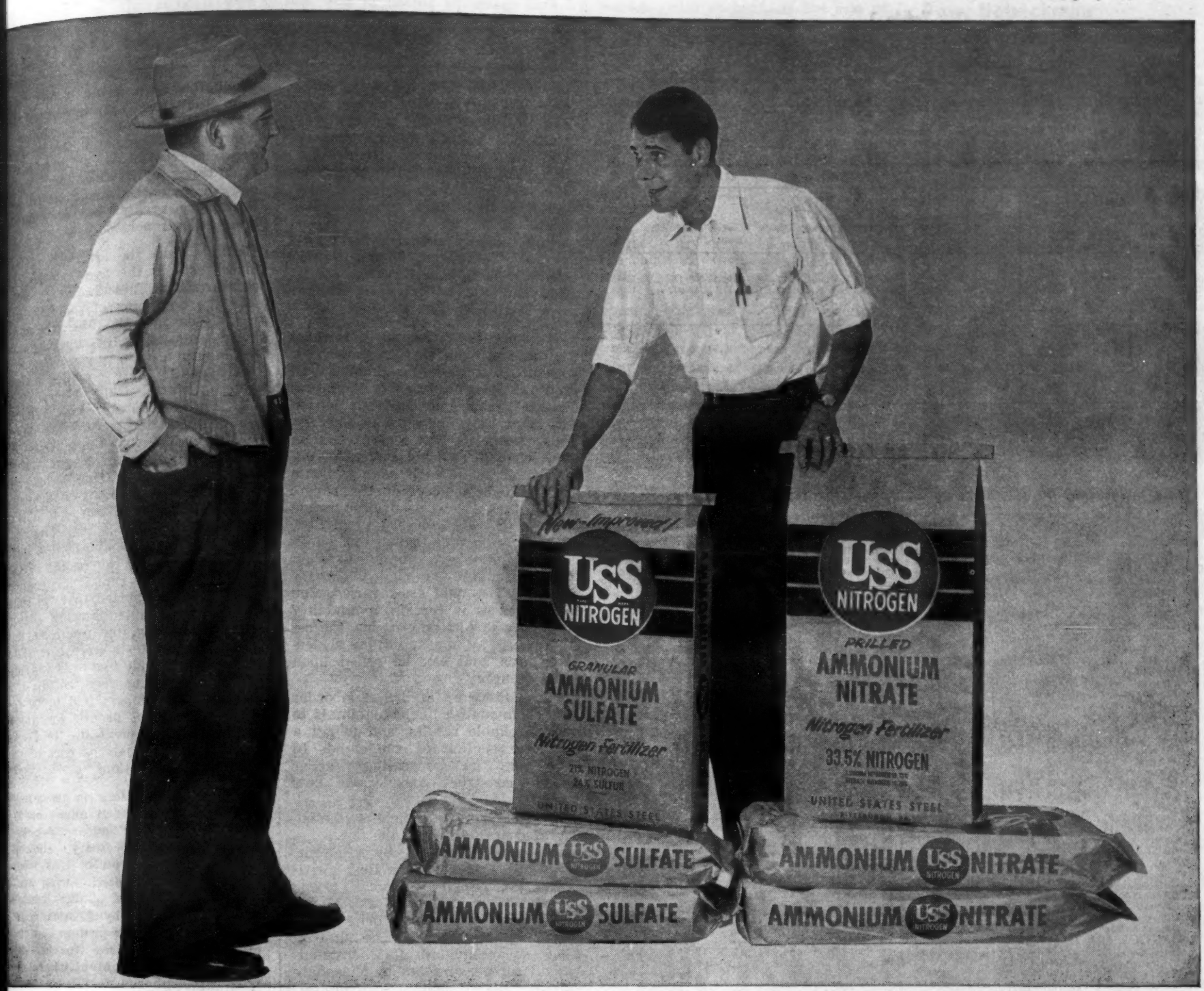

USS NITROGEN

Rx for fall fertilization

You can help your Western farmer friends with their Fall fertilizer programs by recommending USS Nitrogen Fertilizers now. USS Ammonium Nitrate, USS Ammonium Sulfate and USS Anhydrous Ammonia can help you build greater fertilizer tonnage.

Springtime is busy-time for farmers. Fall fertilizing gets a needed job done and gives them extra time when Spring work piles up. In addition, you usually have a more complete selection in the Fall. Farmers who wait until Spring to do their buying often find popular fertilizers sold out.

As you know, you are not alone under the sign of USS. You are backed up with a widespread Western promotion: radio, billboards, direct mail, local newspapers, magazines, state farm papers, dealer signs, banners and other selling aids.

Add your own sales efforts to these and you will be well-repaid at harvest time... by greater yields for your farmer customers and repeat orders for you next Spring.

USS NITROGEN FERTILIZERS USS

UNITED STATES STEEL

Table 1

SUMMARY OF RANGE FERTILIZATION AS MEASURED BY MEAT PRODUCED PER ACRE

County/ Ranch/ Grazing Period	Fertilizer Treatments: Materials lbs/Acre	Nutrients lbs/Acre	Stocking and Rate of Gain: No. of Acres	No. of Animals	Acres/ Animal	Grazing days/Ac.	Aver. Daily Gain/ Animal	Meat Produced & Profit from Fertilization: Total lbs/Ac.	Gain from Fertilization lbs/Ac.	Value of Gain	Fertilizer Cost $/Acre	Gross Profit $/Acre
Alameda Mulqueeney Cattle	Control	-	45	15	3	28	1.42	40.7	-	-	-	-
Dates: Jan.29-Apr.26 86 days	227 Amm. Sulfate	N_{45}	45	25	1.8	48	1.63	77.8	37.1	$7.42	$7.38	$ .04
	273 Am.Sul. 239 S.Super.	$N_{55}P_{47}$	37	25	1.5	58	1.81	105.3	64.6	12.92	13.35	-.43
Glenn Sevier Cattle	Control	-	365	40	9.13	10.4	2.08	21.9	-	-	-	-
Dates: Feb.3-May 12 98 days	108 Urea 126 S.Super.	$N_{48}P_{26}$	133	80	1.66	53.9	1.87	100.9	79.7	15.94	11.26	4.68
Santa Clara Nelson Cattle	Control	-	30	12*	2.5*	22.9	2.30	52.7	-	-	-	-
	300 Am.Sulf.	N_{63}	30	20*	1.5*	60.0	2.50	150.3	97.6	19.52	9.39	10.13
Dates: Feb.24-May 27 90 days	400 16-20	$N_{64}P_{80}$	30	30*	1.0*	93.5	2.40	224.8	172.1	34.42	18.00	16.42
Solano Lawler Cattle	Control	-	92	59*	1.56*	75	1.44	108.7	-	-	-	-
	300 Cal.Nit.	N_{46}	60	59*	1.02*	109	1.85	201.7	93.0	18.60	9.75	8.85
Dates: Jan.26-May17 108 days	249 Am.Sulf.	N_{40}	65	59*	1.10*	85	1.89	161.5	52.8	10.50	6.34	4.22
	273 Am.Sulf. 249 S.Super.	$N_{42}P_{47}$	66	59*	1.12*	97	1.78	172.0	63.3	12.66	9.39	3.27
Tehama Tehmeire Sheep	Control	-	60	30**	2.0	31	.72+	23.8	-	-	-	
	200 13-39	$N_{26}P_{78}$	30	30**	1.0	62	.67+	43.5	19.7	4.06	12.00	-7.94
Dates:62 days Feb.24-Apr.6	400 16-20	$N_{54}P_{80}$	30	45**	.67	93	.83+	104.0	80.2	12.76	19.00	-6.24

*Rate of stocking varied during test **Pairs = Ewe and single lamb +Average daily gain on lambs only

TABLE 2—SUMMARY OF UNIVERSITY OF CALIFORNIA FERTILIZER GRAZING TESTS 1954-55

County and Ranch	Fertilizer Treatment	Meat Production: Grazing days per acre	Average Daily gain pounds	Meat from Pasture lbs. acre	Gain from Fertilizer lbs. acre	Evaluation: Value of extra Meat @20c	Cost of Fertilizer per acre	Gross Profit per acre
1. ALAMEDA								
Mulqueeny	None	45	1.59	72				
135 days	N 50	89	1.61	143	71	14.28	6.71	7.57
Cattle	N 100	103	1.45	149	78	15.52	13.42	2.10
2. GLENN*								
Sevier	None	18	1.68	29*				
161 days	N 60	52	1.68	69	41	8.16	8.45	-.29
Cattle	Carryover	42	1.53	47	18	3.68	...	(3.69)
3. MADERA								
Urrutia	None	37	1.21	44				
128 days	N 80	127	1.63	207	163	32.60	10.71	21.89
Cattle								
4. MARIN**								
Lawson	None	203	.73	147		@17c		
125 days	N 64 P 20	362	.76	277	130	17.65	12.92	4.73
Sheep	N 64 P 40	362	.76	278	131	17.17	14.54	2.63
5. MARIN								
Wheelwright	None	11	1.43	15				
100 days	N 48 P 60	37	1.87	70	55	10.96	12.35	-1.39
Cattle	N 93 P 60	62	1.86	116	101	20.24	18.85	1.39
6. NAPA*								
Alexander	None	173	1.18	67*				
183 days	N 48 P 60	167	1.36	132	65	13.04	11.48	1.55
Cattle	N 93 P 60	280	1.74	253	185	37.08	19.99	17.11
7. SACRAMENTO ..	None	40	1.40	57				
Van Vleck	N 73	88	1.53	135	78	15.54	10.25	5.29
173 days	N 73 P 49	123	1.80	221	164	32.82	14.74	18.08
Cattle	N 59 P 79	107	1.43	152	95	19.06	15.56	3.50
8. SAN MATEO ...	None	47	2.69	127		@15c		
Skyway	N 144	75	2.35	176	49	7.32	21.44	-14.12
148 days	N 144 P 64	138	2.88	396	269	40.28	27.06	13.22
Dairy heifers ...	N 72 P 64	117	3.17	369	242	36.30	16.32	19.98
9. SANTA CLARA ..	None	18	.96	17				
Nettles	N 64 P 20	69	1.41	98	80	16.02	12.92	3.44
91 days	N 64 P 40	69	1.15	80	62	12.42	14.54	-1.68
Cattle	N 64 P 80	69	1.38	96	78	15.62	16.46	-.51
10. SOLANO	None	74	1.99	148				
Lawler	N 100 Am. Sul.	107	2.03	216	68	13.60	13.52	.08
127 days	N 100 Cal. N.	108	1.97	213	65	13.00	18.00	-5.00
Cattle	Carryover	74	1.81	134	-14			(-2.80)

*Meat from pasture after deducting meat equal to cost of supplement feed.
**Evaluation includes lamb gains @17c, ewe gains @5c and wool @60c per pound.

Table 3

RANGE FERTILIZATION DEMONSTRATION RESULTS
CALIFORNIA STATE POLYTECHNIC COLLEGE
San Luis Obispo, California

1952-1955

Date - Green Feed Period	Field A 1952-53	Field A 1953-54	Field A 1954-55	Field B 1952-53	Field B 1953-54	Field B 1954-55	Field C 1953-54	Field C 1954-55
Rainfall - Total inches	16.12	19.74	17.27	16.12	19.74	17.27	19.74	17.27
Acres - Total	49.00	49.00	49.00	55	55	55	55	55
Fertilized	40.00	40.00	40.00	0	0	50	40	0
Fertilizer - Kind	16-20-0	16-20-0	16-20-0	0	0	16-20-0	16-20-0	0
- Rate/acre	300	0	0	0	0	300	300	0
- Date applied	11-1-52	0	0	0	0	11-1-54	11-1-53	0
Animals - Kind	Heifers	Steers	Steers	Heifers	Steers	Steers	Steers	Steers
- Number	41	26	27	26	27	40	40	30
- Into Field	1-15-53	2-12-54	1-4-55	1-15-53	2-15-54	12-17-54	12-18-53	12-17-54
- Out of Field	5-8-53	6-7-54	6-1-55	5-8-53	6-9-54	6-1-55	6-7-54	6-1-55
- Days Grazing	113	115	147	113	123	166	170	166
- Acres/animal	1.2	1.9	1.8	2.1	2.0	1.4	1.4	1.8
- Ave. wt. in	510#	617#	577#	547#	550#	582#	532#	584#
- Ave. wt. out	668#	780#	777#	670#	745#	830#	777#	839#
Total gain/animal	158#	163#	200#	123#	195#	238#	243#	255#
- Daily gain	1.4#	1.4#	1.3#	1.3#	1.6#	1.5#	1.4#	1.5#
*Beef per acre	150	86.2	114	60	95	190	207	161
**Values/acre Beef	$36.00	$18.9	$22.8	$14.00	$20.90	$38.00	$45.50	$32.20
-Fertilizer Costs	$16.00	0	0	0	0	$16.00	$16.00	0
-Profit	$20.00	$18.9	$22.8	$14.00	$20.90	$22.00	$29.50	$32.20
-Unfertilized	$14.00	$20.9	$16.0	0	0	$16.00	$20.90	$16.00
-Net Profit	$ 6.00	-2.0	$ 6.8	$14.00	$20.90	$ 6.00	$ 8.60	$ 6.20

* Adjusted to Fertilizer Acreage
** Beef sold to student feed lot operators at 24¢ in 1953, 22¢ in 1954, and 20¢ in 1955.

Table 4

CO-OPERATOR	COUNTY	RATE & TYPE FERTILIZER PER ACRE	BEEF OR LAMB PRODUCTION IN POUNDS PER ACRE: FERTILIZED	BEEF OR LAMB PRODUCTION IN POUNDS PER ACRE: NOT FERTILIZED	NET GAIN IN POUNDS PER ACRE
Touhey Bros.	Amador	[1]200 lbs. 16-20-0	219	58	161
R. D. Purdy	Placer	400 lbs. 16-20-0	184	—	184
Leon Williams	Tehama	400 lbs. 16-20-0	[3]127	11.6	115.4
Norman Souza	San Mateo	400 lbs. 16-20-0	337.4	42.0	295.4
Frank Nelson	Santa Clara	400 lbs. 16-20-0	225	52.0	173
Frank Nelson	Santa Clara	300 lbs. Am. Sul.	149	52.0	97
Robt. Wilson	Monterey	345 lbs. 16-20-0	256.5	80.0	176.5
Chas. O'Brien	Monterey	300 lbs. 16-20-0	101.3	28.0	73.3
Cal. Poly. Tech.	San Luis O.	300 lbs. 16-20-0	206.9	95.7	111.2
A. C. Pedotti	Santa Barbara	400 lbs. 16-20-0	259	123	136
Edw. W. Lloyd	San Diego	[2]150 lbs. Nitraprills*	247.0	75	172

[1] Following 400 lbs. 16-20-0 applied October, 1952
[2] Following 400 lbs. 11-48-0 applied January, 1953
[3] Lamb production

SIDNEY H. BIERLY

(Continued from page 1)

sity of Califonria in the fall of 1953, Dr. William E. Martin and Dr. Lester J. Berry of the University of California set up animal grazing tests in five counties. (Dr. Martin is agriculturist, agricultural extension service, and Dr. Berry is agriculturist, agricultural extension, department of agronomy). In these initial grazing tests, the farm advisers of Alameda, Glenn, Santa Clara, Solano and Tehama counties and the participating range owners all cooperated.

The purpose was to determine whether nitrogen fertilizer, with or without phosphorus, could be used profitably on winter range. Meat production during the grazing period was used as a measure of success. These were all field-scale trials on land selected as being typical of extensive areas in each county. Some tests were on good, productive range, while others were on poorer range depleted by years of heavy grazing. Some were on soils known to be deficient in phosphorus, and others on land reasonably supplied with this nutrient. The field sizes varied, due to differences in terrain, availability of stock water-holes, etc., but the results were all measured on a per-acre basis, and can be relied upon as to accuracy.

The fields were all large, in order to accommodate sufficient animals to obtain reliable results, and to get a fair cross-section of rangeland. In each case, the cooperating rancher had to construct considerable new fence.

In addition to the ranchers who cooperated in these trials, the fertilizers used were donated by Balfour, Guthrie & Co., Ltd., The Best Fertilizers Co., Shell Chemical Corp., Stauffer Chemical and Norsk Hydro of Norway through the efforts of Wilson & Geo. Meyer & Co. The material used was ammonium sulfate, ammonium phosphate, ammonium phosphate sulfate, superphosphate, calcium nitrate, and urea.

The basic plan was to provide for three contiguous comparable fields—one for a check or control plot, the second to be fertilized with nitrogen only, and the third receiving a nitrogen-phosphorus treatment, though some modifications had to be employed. Grazing was carried out as close to normal ranch operations as possible. Uniform animals were weighed into the fields when green feed had grown to a height of four or five inches on the fertilized areas. The untreated fields were stocked at the rates selected by the ranchers as the normal carrying capacity of the range. Fertilized fields were stocked more heavily, at rates estimated to approximate the available feed. Where necessary, extra animals were added to utilize the additional feed. No supplemental feed was supplied.

Samples of forage were taken from all the experimental fields, and analyzed to determine the effect of fertilizer treatment upon the chemical composition of forage.

The results of the first year of these grazing tests are described by Drs. Martin and Berry as being "most encouraging." In every case, there were large increases in meat production as a result of fertilization. Earlier feed was produced in the fertilized field in every test. Meat production per acre was increased "from nearly twice to over four times by fertilization." Percentage increases due to fertilization were greater on the poorer lands, they reported.

Results from the first year of fertilizer tests in the five counties are summarized in Table 1.

At the beginning of the following grazing season (fall, 1954), the number of tests under the supervision of Drs. Martin and Berry were increased to ten, with these counties added: Madera, Marin, Napa, Sacramento, and San Mateo; and with Tehama County out of the picture. Fertilizers were donated for these tests by Badische-Analine through Atkins, Kroll & Company; The Best Fertilizers Co.; E. I. du Pont de Nemours & Co.; Norsk-Hydro through Wilson & Geo. Meyer & Co.; Shell Chemical Corp.; and Western Phosphates, Inc.

In summarizing the results of the second year of range fertilization trials, it was reported that "in spite of an unfavorable growing season with prolonged winter drouth and unusual cold, all tests were carried to completion. In only two tests was supplemental feeding required. In two tests, cattle numbers had to be reduced because of drouth conditions. In one test, supplemental feed was supplied in all fields as part of the usual ranch operations.

"Field observations on areas fertilized with nitrogen alone, or in combination with sulfur or phosphorus where necessary, showed earlier winter growth, less frost damage, better growth during winter drouth, better quality winter feed, as measured by chemical composition—a) higher protein content of nitrogen-fertilized forage, b) high phosphorus content where nitrogen-phosphorus fertilizers were applied to phosphorus-deficient soils."

Grazing results by test animals showed that the carrying capacity increased in every test by fertilization—on unfertilized range the number of grazing days to the acre averaged only 40, while on the best treatment in each test, the average was 102.4 grazing days an acre.

Meat production to the acre was increased in every test by fertilization—unfertilized range produced an average of 71.5 lb. meat an acre, and the best treatment in each test produced an average of 193.2 lb. meat an acre. The value of the extra meat produced exceeded the fertilizer cost and application in seven of the ten tests. In these seven, the average gross profit was $15.00 per acre.

Results from the second year are summarized in table 2.

By the fall of 1955, the number of tests in this continuing series increased to sixteen, with Fresno, Lake, Placer, San Joaquin, Shasta, Sonoma and Yolo counties added; and Napa, San Mateo and Santa Clara counties omitted. That winter season brought unusual and unbalanced rainfall. The phenomenal December storms brought nearly 50% of the usual normal annual rainfall, which reduced the average recovery of the nitrogen which had been applied. Then, the last portion of the winter season saw a com-

Table 5

Per acre profit or loss from the first year application of fertilizer, name of the co-operator, cost of fertilizer per acre, gross return in net beef gain per acre expressed in dollars per acre and the net cash gain or loss per acre expressed in dollars per acre:

PER ACRE PROFIT OR LOSS FROM FIRST YEAR APPLICATION OF FERTILIZER

CO-OPERATOR	FERTILIZER COST PER ACRE	GROSS RETURN ON NET BEEF GAIN PER ACRE	NET CASH GAIN OR LOSS PER ACRE
R. D. Purdy	$ 18.00	$33.12	$15.12
Leon Williams	18.00	25.96	7.96
Norman Souza	18.00	60.56	42.56
Frank Nelson	18.00	36.40	16.60
Frank Nelson	9.40	19.40	10.00
Robert Wilson	15.50	35.30	19.80
Chas. O'Brien	13.50	14.66	1.16
Cal. Poly. Tech.	13.50	24.46	10.96
A. C. Pedotti	18.00	30.60	12.60

Table 6

Per acre profit or loss from second-year application of fertilizer and noted in parentheses the first-year returns, name of co-operator, cost of fertilizer per acre, gross return on net beef gain per acre expressed in dollars per acre and net cash gain per acre expressed in dollars per acre:

CO-OPERATOR	FERTILIZER COST PER ACRE	GROSS RETURN ON NET BEEF* GAIN PER ACRE	NET CASH GAIN OR LOSS PER ACRE
Touhey Bros.	$ 9.00	$32.20	$23.20
(first year 1952-53)	18.00	36.27	18.27
Edw. W. Lloyd	7.50	34.40	26.90
(first year 1952-53)	24.00	(Cow-Calf set-up profit or loss not calculated)	

te reversal, as the rainfall was ch below normal for that period. In spite of these adverse conditions, fertilizer cost per pound of extra f produced on fertilized fields was low 15¢ in six tests; 15¢ to 18¢ in ee tests; and in four tests this cost nt up to 24¢ or more, due to proged water-logging of the soil. On basis of an arbitrary beef value 18¢ a pound, nine of thirteen tests urned fertilizer costs or showed a ofit. The average profit for all tests 18¢ per pound for the beef, was .60 per acre, after deducting costs fertilizer and application.

The fertilizers used in the third ear of tests were donated by adische-Aniline through Atkins, roll & Co.; The Best Fertilizers o.; Brea Chemicals, Inc.; E. I. du ont de Nemours & Co.; Olin athieson Chemical Corp.; Norsk ydro through Wilson & Geo. Meyr & Co.; Shell Chemical Corp.; unland Industries, Inc.; and Westrn Phosphates, Inc.

Concerning the range fertilization search which has been going forard at the California State Polychnic College, San Luis Obispo mpus, Dr. Logan Carter, head of at institution's department of soils ade a report to the fourth annual lifonria fertilizer conference, held Riverside in April of 1956. He said at green feed was obtained from ur to six weeks earlier on fertized plots, and at a most critical feed eriod for range land operators. He ported that fertilization permitted higher rate per acre of stocking, d in some instances as much as vice the number of animals were pported.

Fertilization insured more uniform imal harvesting of forage, with less roblem of weed development. The imals on fertilized forage were in tter condition for feed lot finishg. Finally, he said, fertilization proides better quality of dry forage for mmer grazing of animals needing maintenance ration.

Dr. Carter reported that fertilizer eatments were made in the fall of 52 before rainfall began, at the te of 300 lb. an acre of 16-20-0 as e initial application. One applicaon of the fertilizer has been applied ch three years, with green-feed razing periods between fertilizer eatments. The material was applied roadcast. The project is a joint acvity of the school's soil science and imal husbandry departments, and tudents have conducted the demonrations under careful supervision. he record of meat gain and net rofit per acre is set forth in table 3.

Balfour, Guthrie & Co., Ltd., conucted a series of field-size fertilizer emonstrations in nine California ounties on 13 properties in 1952-53 nd 1953-54, for which it supplied all he fertilizer used. The demonstraions were carried out in cooperation ith 12 individual ranchers, several oil Conservation Districts, and Calirnia State Polytechnic College at an Luis Obispo. Nine counties, typial of California's range areas, were hosen so as to include a wide varity of soils and climates with which ivestock producers of the state must ontend. They were Amador, Monerey, Placer, San Diego, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, and Tehama. Close conrol was maintained by qualified perons throughout the demonstrations, epresentative of the Soil Conservaion Service, California State Polyechnic College, University of Californ ia, the industry, and local livestock men.

Approximately 40 acres of grazing land on each selected range was fertilized, and similar plots adjacent to each was left unfertilized. All fields were fenced, and each pair of fields were grazed by the same types of livestock. Accepted methods of weighing the stock in and out, and of taking shrinkage into account, were followed rigidly.

The average results showed that proper fertilization of this range land produced four times as much beef to the acre, and provided range readiness four to six weeks earlier than did the adjoining un-fertilized land. The average increase in profit through fertilization was $16.99 an acre. The published report on the two year demonstrations said, "from this report of range fertilization demonstrations, it is clear that both nitrogen and phosphate are needed in a successful fertilizer for most California range conditions.—This combination causes earlier and speedier growth of forage high in nutritive value (and) ensures faster growth of all livestock."

Table 4 shows the net gain in meat production per acre, measured in pounds, from use of fertilizer in forage production.

Table 5 shows the net cash gain per acre on the basis of then-current market price of beef, at the end of the first year of the demonstration.

Table 6 shows the profit from an acre from the sale of the cattle of two other cooperators at the end of each of the two years.

The trials of the University of California and at California State Polytechnic College are continuing, and we are sure that the long-range results will prove beyond question that dry range fertilization will pay big dividends to the livestock producer. As noted above, we have had two abnormal years of the three included in the University tests. A series of normal years, or a long-range average of all the annual tests should be favorable to proper fertilizer practices.

We are extremely optimistic regarding the potential in California of dry range and of improved pasture fertilization. We recommend that similar research be carried on in other range land states, as a new tremendous potential outlet for commercial fertilizers.

Dow, Dobeckmun Directors Approve Merger

MIDLAND, MICH. — Directors of the Dow Chemical Co. and the Dobeckmun Co. of Cleveland have approved a proposal for merger of the two companies. The proposal is subject to ratification by Dobeckmun stockholders at a meeting called for Aug. 30 in Cleveland.

If the merger proposal is approved by Dobeckmun stockholders, Dobeckmun would continue to operate under its present officers and the firm would become known as the Dobeckmun Co., a division of the Dow Chemical Co.

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A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Western states.

Tariff Commission Says Pesticide Output Up 13%

An upward curve in pesticide production and sales is seen in the preliminary report just issued by the U.S. Tariff Commission, covering the year 1956. The total output of pesticides and other organic chemicals for agricultural use was 570 million pounds, representing an increase of about 13% over the previous year. Sales were over 395 million pounds valued at $173 million.

The year before, the report states, sales were 415 million pounds but the dollar value was $153 million.

Materials included in the report were fumigants, fungicides and seed disinfectants, herbicides and plant hormones, insecticides, rodenticides and soil conditioners.

Of the cyclic chemicals listed in the report, DDT was produced in the greatest amounts, its output being 138 million pounds in 1956.

One would gather, in looking over this report which the tariff commission says is more than 95% complete, that despite the hue and cry of the anti-pesticide crowd, business remains in a pretty healthy state.

Agricultural economics being what they are, wherein a grower must get top production from the fewer number of acres being used, pesticides are becoming more and more important every season. No longer is it very likely that a farmer will sit back and let the bugs take over part of his crop, when he has invested heavily in seed, fertilizers, time, and materials to get maximum return from his plantings.

There is a great future in the pesticide business and this recent report tends to verify that fact. There are too many favorable factors to make one think otherwise, even in the face of an occasional bad season.

Off-Season Fertilization Seen as Market Boon

The subject of off-season fertilization has been attracting a lot of attention of late, with the industry fervently looking forward to the time when tonnages for the year might be distributed over a greater number of months. It's not that the industry wants to sell less in the spring, but rather, it would like to step up sales in seasons other than what is already the peak selling time.

The industry is not alone in hoping to see an awakening of interest in off-season use. Some prominent college and university soil experts are also speaking out in favor of off-season application of fertilizers, particularly in the fall of the year.

James P. Thorne, soil scientist at the Utah agricultural Experiment Station, Logan, says that of the 20,000-odd tons of fertilizers used in his state each year, from 75 to 90% is applied in the spring. As he sees it, the pattern could well stand some changing. "For several years, specialists at the college and those of private firms such as sugar companies, have recommended that fertilizer be applied to some crops during the fall, or perhaps I should say be applied to land in anticipation of growing certain crops the following year . . . In general, our experiments have shown that application of nitrogen to dryland wheat can be fertilized in the fall; irrigated pastures, alfalfa, and no doubt a number of other crops can also be fertilized in the fall.

"I personally believe that if application of fertilizer could be more evenly distributed over the year that there would be more fertilizer used and crop production would be higher. The problem seems to me as being to a large extent psychological, although it is to some extent a financial problem, too. If the farmer applies fertilizer in the fall, to be used by a crop to be harvested the following fall, as opposed to applying the fertilizer in the spring, he has his money tied up for at least six months longer. If there were a substantial price benefit from fall application of fertilizer, this of course would be an inducement to make the application at that time of year. I think fall fertilization should be promoted more vigorously by the advertising of industry. Also I think that fall sampling and testing of soil should be advocated perhaps more vigorously than it is. This would help us as well as the farmers and the fertilizer industry to even out the work load of the program."

H. M. Reisenauer, associate professor of soils at the State College of Washington, has stated that the education of fertilizer dealers is one of the large problems of achieving the objective of greater fall use of fertilizer materials, and observes that a great potential for more volume exists in this area.

Mr. Reisenauer declares that "It would not be difficult to double the fertilizer use on many of our lower value per acre crops in Washington during the next ten years. If one compares fertilizer consumption on an acre basis in Washington with that of other areas of the U.S. or particularly European countries, we find that we are extremely low. This increase in fertilizer use which should at least give a 50% increase in over all fertilizer consumption for the state, will result only from emphasis on all aspects of the problem."

It is this over-all increase in fertilizer consumption that provides the main attraction to the trade.

Suggestions Point to Better Terminology

An editorial appearing in this column a few weeks ago discussed the unfortunate connotation which has arisen with use of the term "heavier fertilization." Although innocent phraseology in itself, the words have come to be associated with agricultural overproduction, and thus a factor of blame for creating farm surpluses.

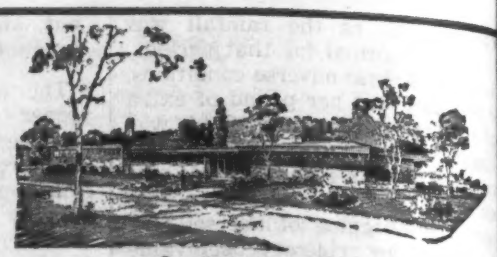
We suggested the use of alternate terms which would put over the idea of applying enough plant food to bring optimum economic returns without contributing to overproduction, and opened the way for further ideas to be contributed by readers.

Quite a few of suggestions have come in from several parts of the country. George Stanford, chief of soils and fertilizer research for TVA, Wilson Dam, Ala., offers the term "Rational Fertilization" as being appropriate. This, he says, "connotes sensible use of fertilizers based upon any and all available information being applied in making decisions as to use. Actually, the meaning is broad enough to be used irrespective of changing conditions, both as to methods and economic conditions; that is, a rational use ten years ago does not necessarily correspond to a rational use today. Thus, the term is one which would endure the test of time. It is irrational to use lesser quantities of fertilizer than will give optimum over-all benefits to the farmer in his operations."

Several persons have suggested the term "Adequate Fertilization" which seems to connote a not-too-little and not-too-much utilization.

Murry McJunkin, U.S. Steel Corp., agronomist, Pittsburgh, Pa., suggests "Efficient Fertilization," and Sidney H. Bierly, general manager of the California Fertilizer Assn., San Marino, says that "Recommended Fertilization" or "Fertilizer Application as Recommended," might be appropriate. He also seconded Mr. McJunkin's suggestion of "Efficient Fertilization."

Others have commented on the subject, but the above ideas appear to carry the main theme of more accurate terminology. Any further suggestions?



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WHAT'S NEW

(Continued from page 18)

on and paddle agitators. The mixers have dust-tight, gasketed, hinged cover with quick opening clamps, marine type compression packing glands and anti-friction outboard bearings with sealed roller bearing pillow blocks — one fixed and one floating. Discharge is made either from the center or the end by a slide gate or a worm gear operated plug gate. The portable mixers are furnished as complete units with motors and drives. They are recommended for mixing dry, free flowing powders or granular materials. Secure complete details by checking No. 5726 on the coupon and mailing it to this publication.

No. 5733—Sewing Head Attachment

A new sewing head attachment has been announced by the Union Bag-Camp Paper Corp. Called the U & C Acto-Cutter, this attachment automatically starts and stops the sewing head and also cuts the thread chain between bags, company officials said. They continued: "Field experience shows that the use of the Acto-Cutter reduces the human element in sewing to a point where an inexperienced operator may be used. The attachment also makes it possible for one operator to easily perform the combined operation of carefully forming the bag tops and then feeding the bags into the sewing head. Another advantage is that it reduces torn, unsightly and irregular sewn closures to a minimum." Designed for use on the Union Special 80600E sewing head, the unit is available in two basic models. Secure details by checking No. 5733 on the coupon and mailing it to this publication.

No. 6588—Sulfur Brochure

The Stauffer Chemical Co. has published a comprehensive 48-page brochure on sulfur. The brochure contains a description of production and refining techniques, statistics on the world's production of sulfur, and notes on the various uses of the material. It also includes specifications for the several types of conventional and insoluble sulfurs used in industry and agriculture, and tabulations of the physical and chemical properties of sulfur in its different forms. A copy of the brochure, "Stauffer Sulfurs," is available free on request. Check No. 6588 on the coupon and mail it to Croplife.

No. 6598—Insect Control

The Glenn Chemical Co. has announced the production of Tabutrex, a chemical which acts as a barrier to flies, called a new approach to the insect control problem. The company says the product has the approval of the U.S. Department of Agriculture. Tabutrex is an odorless and colorless liquid that is claimed to be completely safe to use. Company officials said its properties prevent the fly from alighting on a dairy animal and therefore the pest cannot bite or in any way affect the well being of the animal. The company has completed four years of research and experiments on the product. For details check No. 6598 on the coupon and mail it to Croplife.

No. 6603—Technical Data Bulletin

Thiosemicarbazide, a reactive compound which behaves as a mono-acid base and is a strong reducing agent, is described in a new technical data bulletin issued by the industrial chemicals division of the Olin Mathieson Chemical Corp. The bulletin describes the product's application in insecticides, fungicides, antibacterial agents and stabilizers. The four-page bulletin gives information on physical and chemical properties, typical reactions, uses, literature references, and availability. Secure it by checking No. 6603 on the coupon and mailing it to Croplife.

No. 6605—Fly Killer

African Pyrethrum Development, Inc., announces a fly killer for dairy barns that is "positive and economical but completely harmless to cows and to consumers of dairy products." The announcement was made following the establishment by official sources "that these qualities have been proven for formulations containing Pyrethrum (PYR), the natural flower-base insecticide, in combination with certain approved synergists, which extend and increase PYR's natural capabilities," according to officials of the organization. The synergized compounds are said to be equally effective in the form of sprays, fog, wettable powders or emulsions. A booklet is available without charge. Check No. 6605 on the coupon and mail it to Croplife.

No. 6606—Cotton Miticide

"Chipman 6199" is the product described in a technical service bulletin which has been issued by the Chipman Chemical Co., Inc. The product, formerly called "Tetram 75," and its recommendations for experimental use on cotton are outlined in the bulletin. The product is described as a fine granular, non-duty organic phosphorus compound which is readily soluble in water for spray application. It is claimed to kill spider mites and suppress aphids. Secure the bulletin by checking No. 6606 on the coupon and mailing it to Croplife.

Irrigation Water Supply Favorable in Utah

SALT LAKE CITY — Irrigation water supplies in Utah are better than they have been for several years, county agents in scattered parts of the state reported recently.

Stream flows are holding up and water for irrigation is adequate to take care of crops for the remainder of the year, the agents said in the weekly weather and crops report issued by the U.S. Department of Agriculture, the Department of Commerce and the Utah Extension Service of Utah State University.

Water conditions were reported good in Beaver, Cache, Davis, Duchesne, Emery, Juab, Kane, Morgan, Salt Lake, Sanpete, Tooele, Uintah, Utah, Wasatch and Weber counties.

"There will be no crop failures in Utah from lack of irrigation water," the report said. "Some irrigated alfalfa and grain will suffer from lack of water in August and September, but only in farming areas that always run low on water in late summer."

George S. Kido in Scott Research Post

SAN FRANCISCO — Appointment of Dr. George S. Kido as director of western research has been announced by Paul C. Williams, president of O. M. Scott & Sons. Dr. Kido was formerly associated with the Scott central research division in Marysville, Ohio. More recently he has been director of the insecticide testing laboratory of the Wisconsin Alumni Research Foundation. Dr. Kido will make his headquarters in San Francisco and will supervise the Scott research and home-lawn testing program in California and the Northwest.

Income from Pastures Could Be Much Greater

LOS ANGELES, CAL.—Fertilizer can materially increase net income from pasture and range land, the California Fertilizer Association says. The average livestock producer and the average dairyman now uses this vital crop production tool in inadequate amounts, according to agricultural authorities.

Ezra Taft Benson, secretary of agriculture, recently said that farmers, caught in a price-cost squeeze, must obtain the best economic use of all their tools of production, and that they will doubtlessly weigh more carefully now than ever before their needs for chemical crop production aids.

Secretary Benson said "The trend toward a more efficient, balanced agriculture already is resulting in wider use of plant foods. Studies by the Department of Agriculture show that farmers in general seem willing to spend money and time to fertilize such crops as corn, cotton, vegetables and many others while they virtually neglect hay, pasture and cover crops.

"The averages show, for example, that potatoes get 83 lb. an acre of nitrogen, and green and yellow vegetables 68 lb., while hay crops receive only a pound of nitrogen an acre, and pasture or cover crops less than a half pound an acre. A similar situation exists with phosphate and potash. The increasing emphasis on grassland agriculture will, however, necessitate increased use of fertilizer on pasture crops, in many cases along with irrigation. Research is showing farmers how to make these practices pay."

Mr. Benson said further "Today, more than ever before, farmers need to use combinations of crops and fertilizers that can reduce cost of production and increase returns.

"The USDA finds that failures to obtain stands in seeding pasture and hay crops cost farmers $50 million a year in wasted seed alone. Recent studies show that complete fertilizers, high in phosphate and properly placed in relation to forage crop seeds at the time of seeding, not only boost yields, but also help to keep down weeds."

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